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ANNUAL REPORT

OF THE

SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES

FOR THE FISCAL YEAR

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TREASURY DEPARTMENT,
OFFICE OF THE SECRETARY,
Washington, December 3, 1923.

SIR: In accordance with section 9 of the act of Congress approved July 1, 1902, I have the honor to transmit herewith the report of the Surgeon General of the Public Health Service for the fiscal year 1923.

Respectfully,

A. W. MELLON,
Secretary.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

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ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE.

TREASURY DEPARTMENT,
BUREAU OF THE PUBLIC HEALTH SERVICE,
Washington, October 15, 1923.

SIR: In accordance with the act approved July 1, 1902, I have the honor to submit, for transmission to Congress, the following report of the operations of the United States Public Health Service for the fiscal year ended June 30, 1923. This is the fifty-second annual report of this service, covering the one hundred and twenty-fifth year of its existence.

In conformity with existing law and the practice in past years, account has been taken of the prevalence of communicable diseases throughout the world and the state of the public health in our own country. Presumably because of unsettled economic, social, and political conditions abroad, certain communicable diseases have been widespread here and there in foreign countries In Russia typhus fever was reputed to be responsible for a large number of deaths. An endemic center of cholera existed in southwest Russia and there was apprehension lest its borders would be extended to other European countries. The prevalence of plague in many foreign countries continues and many foci were established in the Canary Islands, Mexico, and other places. Here and there in South America and in Mexico isolated outbreaks of yellow fever have occurred. Special attention has been paid, however, by the sanitary authorities of these countries to the prevalence of this disease and record of its spread has been carefully kept through reports of the Consular Service in these localities. Furthermore, the International Health Board has maintained an organization and conducted active preventive operations in cooperation with these countries. In consequence of the enforcement of the international sanitary agreements and the maintenance of the national quarantine system, no cases of the major quarantinable diseases have gained access to this country within the year.

As evidenced by the sanitary reports generally, health conditions throughout the United States have continued as satisfactory as in recent years. Furthermore, an increasing interest in public health improvement has been manifest.

A sharp outbreak of yellow fever in Colombia, reports of suspicious cases in other places, and evidence of a high mosquito index in certain seaports in tropical America have made it necessary to impose somewhat more stringent quarantine restrictions on account of this disease than during the previous year. In spite of these precautions the delays to vessels have been practically negligible. It is pleasing to note that the recognition of the Government of Mexico and the general improvements contemplated in sanitary conditions by Mexican ports may make it possible to remove some of the more stringent restrictions which were made necessary during the present

year. Before removing any stringent quarantine restrictions the Public Health Service, however, can not escape the consideration of the fact that there has not been an epidemic of yellow fever in the United States since 1905 and that the population in all of the Southern States now contains a very small proportion of persons immune to yellow fever. This means that if yellow fever should be introduced and gain a foothold in any of the southern ports extensive operations would be required to check its progress.

The plague work of the service which has heretofore been the subject of much consideration in the annual reports has now practically faded out of the picture. Both human and rodent plague appear to have been eradicated in the United States except for infected ground squirrels in California, and all antiplague measures in States except California have been discontinued. It will be recalled that bubonic plague was first introduced into the United States in 1899, and that this disease has presumably existed in the United States on the Pacific coast either in rats or ground squirrels (when not found in human beings) ever since that date. The occurrence of plague in New Orleans, La., in 1914, and in Pensacola, Fla., Galveston and Beaumont, Tex., in 1919 was undoubtedly due to its importation on vessels (probably by means of infected rats), and not to the spread of this disease from the reservoir of infected ground squirrels in California.

Although only one human case of this disease occurred in the United States during the fiscal year, I deem it my duty to emphasize the fact that owing to the difficulty, I may say the impossibility, of completely exterminating rats on board vessels and the present widespread dissemination of plague geographically, there is constant danger of the introduction of this disease at all seaports engaged in foreign trade. Under present conditions this must be so. To adopt restrictive measures sufficiently stringent to prevent this would be to practically disrupt our commerce.

In addition to plague, cholera, smallpox, and typhus fever will continue to occupy the attention of all of the maritime quarantine stations of the United States, but since all of the maritime quarantine stations at domestic ports are now operated by the Public Health Service the carrying out of quarantine restrictions for these diseases has been made uniform. The periodical fumigation of ships required by United States quarantine regulations and made in accordance with international agreement has expedited the enforcement of quarantine measures and relieves shipping of many delays incident to quarantine detention. In order to further expedite operation of the quarantine inspections the medical officers stationed in European, Asiatic, and Spanish-American ports have been continued on duty and have almost entirely obviated the necessity for the detention of vessels in quarantine at ports of arrival in the United States. The officers stationed in European ports have also greatly aided in the operation of the medical examination of immigrants, and if the Congress passes laws providing medical examinations of immigrants before embarking for America the officers now stationed in European ports will form a decided nucleus for the organization of a medical corps for such examinations as may be required by law.

In connection with the revision of several international sanitary conventions, which, of course, would have affected American shipping

in ports abroad, it was considered desirable for the Surgeon General to attend two conferences which have been held during the year in Europe in addition to the inspection of service quarantine activities abroad.

Since the transfer of certain hospitals on May 1, 1922, to the Veterans' Bureau the marine hospitals now number 25, which includes the National Leprosarium at Carville, La. The facilities in these hospitals have been improved to keep pace with the modern developments in medical and hospital service. The marine hospitals now provide a trained female nursing service, physiotherapy aids, dietitians, and consultants in the various specialties of medicine and surgery. They are equipped with all of the modern appliances and instruments for diagnosis and treatment. These facilities are made available for all of the beneficiaries of the service by an arrangement for the transfer of patients from the smaller ports and places.

The great advancement in the hospital standards of the Public Health Service was made during and as a result of the war and the character of the service now compares favorably with that of the civilian hospitals. It is gratifying to state that notwithstanding the improvement in the hospital service there has been a reduction in the per diem cost. It is now approximately $4 per day per patient. The per diem cost in certain civilian hospitals in a number of the large cities which are furnishing similar care and treatment was found on inquiry to be $6 per day, or 50 per cent more than that of marine hospitals. The cost in marine hospitals compares favorably with that of other Government hospitals.

The beneficiaries of the service, which have trebled since 1915 and doubled since 1918, now receive a medical and hospital service which is second to none in the United States. While inviting your attention to the general elevation in the hospital standards and equipment, I must, however, point out the urgent need for repairs and replacement of certain marine hospital buildings. The majority of them are old and in a state of dilapidation and do not reflect proper credit upon the National Government. An estimate of $570,000 for necessary major repairs to marine hospitals for the next fiscal year has been made by the Supervising Architect and transmitted by you to the Bureau of the Budget. New marine hospitals are needed in some places to meet the growing shipping demands and extensive new construction required to replace antiquated buildings, many of which present serious fire hazards.

The studies of and demonstrations in rural sanitation have shown that the fundamental need throughout the rural districts of the United States is for the establishment of efficient local whole-time health service through which the measures necessary for the protection and promotion of the public health may be conducted in logical sequence and in proper relation to each other. The interests of the Federal Government in preventing the spread of disease between the States and in promoting general health and prosperity are best served by aiding in establishing, developing, strengthening, and maintaining the efficiency of State and local health departments. The studies and demonstrations have fulfilled their purpose, and the work should now be placed upon a cooperative basis which will enable the service to work out with each State its own peculiar problems and to extend the kind of assistance that is most needed.

The investigations made by the service during the fiscal year have been along many lines, among which may be mentioned the Paris green method for the control of mosquito breeding in ponds and the creosote method for repelling mosquitoes in dwellings which can not be screened, both of which methods have been developed by the service and are proving of value in antimalarial work. A real contribution to the treatment of neurosyphilis and the prevention of insanity due to this disease has been effected by designating the forms of arsenic most effective in treatment. In this connection it may be said that the research and other work of the service has often proved of very definite and far-reaching value, and while it may not be possible to measure this accurately, it nevertheless does represent a very great saving in money values as well as in the prevention of suffering, illness, and death.

The present inadequate pay in the lower grades for commissioned officers, together with relatively long periods of service before officers are eligible for promotion, have made it impossible to induce properly qualified physicians to enter the service as assistant surgeons, which is the only grade in which they may enter the regular corps. In order to meet this situation it has been necessary to continue the employment of acting assistant surgeons and reserve officers to a degree which is inimical to the best interests of the Government. On account of the advantages of a mobile corps and the urgent need for efficient workers, the number of regular commissioned officers should be substantially increased. Such an increase would not augment the total personnel, nor should it call for additional appropriations, as these officers would take the places of temporary employees.

DIVISION OF SCIENTIFIC RESEARCH.

In charge of Asst. Surg. Gen. A. M. Stimson.

The chief purpose of the Division of Scientific Research is to conduct investigations which will lead to the securing of information which may be utilized in the prevention and suppression of disease and in the promotion of health. Because this division necessarily maintains a scientifically and technically trained force and special physical facilities, it is charged with the additional duty of performing the inspections and tests required in the Federal control of the sale of viruses, serums, and analogous products, collectively known as biologic products.

Both in the methods employed and the subjects investigated the research activities have been most diverse. Thus the methods have included those of epidemiological and laboratory technic applied in the field and at central stations, and the subjects have included the extremes of methods of public health administration and intimate problems of chemistry, bacteriology, and pathology. Geographically these studies have taken place in 32 States and in Hawaii and Porto Rico. Advantage was also taken of an opportunity to study public health methods in England and Austria, afforded by an interchange arranged by the health section of the League of Nations.

The system of conducting investigations previously employed has in general been adhered to; namely, that of selecting qualified experts to plan, conduct, and report upon all of the investigations grouped under a major topic, subject to bureau approval. Notwithstanding this general plan, care has been taken to encourage useful personal initiative on the part of individual workers, and with beneficial results. New subjects have been referred to the Bureau of the Budget before activities have been commenced, in compliance with an Executive order in the interest of avoiding duplication.

The larger activities, to each one of which an expert and a group of trained workers have been assigned, are: Child hygiene, industrial hygiene, stream pollution, epidemiology and statistics, malaria, and sewage disposal. In addition, individual diseases or minor topics have been studied as follows: Cancer, clonorchiasis, diphtheria, dengue fever, Malta fever, pellagra, tuberculosis, typhoid fever, yellow fever, leprosy, Rocky Mountain spotted fever, food poisoning, mental hygiene, milk, and public health administration.

The study of many of these subjects has been continued from the previous year, but a few represent new activities.

Inasmuch as the valuable results of studies made by this division are of little use unless they be effectively placed at the disposal of health agencies who desire to apply them in practice, the publications emanating from this division may be regarded as its ultimate output.

A brief summary of the activities of the division during the past year follows:

Cancer.

In August, 1922, field investigations of cancer and other malignant growths were begun by Surg. J. W. Schereschewsky. Office space and the use of laboratory and other facilities were placed at his disposal in the department of preventive medicine in the Harvard University Medical School, through the kindness of Prof. M. J. Rosenau. Studies have been carried on during the year of the data on cancer mortality in the United States for the past 21 years, this period being selected because its beginning marks the commencement of effective organization of the death registration area of the United States.

One of the noteworthy features about cancer mortality in the United States has been the apparent and steady increase in the death rate over a number of years. Thus, in 1900 the death rate per 100,000 population in the registration area of the United States was 63. In 1920 the rate was 83.4 per 100,000, an apparent increase of 20.4 deaths per 100,000. This increase was continuous to 1917, if the years 1906 and 1911 be excepted. It is not continuous after this date. On the face of things, therefore, there has been a very noticeable increase in the death rate from cancer, which, if accepted as real, without further question, might give rise to very serious concern. However, there are a number of factors which, from their operation, might well cause such increase in mortality to be apparent rather than real. For example, changes in the age constitution of the population, better medical diagnoses and certification, increased numbers of survivors to the ages at which cancer particularly selects its victims, due to the advance made in the prevention of other diseases, all may, and doubtless have, played a part in an apparent increase in the death rate from cancer.

The compilation of the data covering 10 States, formerly the original registration area of the United States, for which complete mortality returns are available for the entire period, is now nearly finished and ready for further statistical analysis.

Clonorchiasis.

During the past year investigations have been conducted by the service on the Pacific coast, under the direction of Surg. N. E. Wayson, in order to determine whether conditions exist in the United States which might permit the spread of clonorchiasis. This is a chronic, practically incurable disease, caused by a worm (*Clonorchis sinensis*) from one-half to three-quarters of an inch long which infests the bile ducts of the liver and leads to prolonged invalidism and sometimes death. It is classified under the immigration laws as a dangerous, contagious disease. It is conveyed to man through two intermediate hosts, certain species of fish and snails. The investigations have included a survey by means of fecal examination of inmates of prisons, asylums, and hospitals and of individuals outside of institutions to determine the incidence of clonorchiasis among orientals and Caucasians born in the United States; the examination of clinical and postmortem data to determine whether infection has been contracted in the United States; experiments to determine whether the fresh-water snails of the Pacific coast are suitable inter-

mediate hosts for the parasite; determination of clonorchiasis infection among cats and dogs, and therapeutic research. The results of this study, which is incomplete, may be briefly indicated as follows:

The disease is present and has been present in natives of oriental parentage for a period of at least 20 years. It is prevalent in that section of China furnishing most of the present Chinese emigrants to this country, and is present in an appreciable percentage of those Chinese who apply for admission to the United States.

No reports have been made of the infestation of man or the lower animals who have resided continuously in the United States, nor has infestation been found after an investigation in California of 407 people, 38 dogs, and 8 cats, and 1,468 hogs from a district in which the disease is known to be present in immigrant Asiatics.

The Asiatic intermediate hosts (snails and fishes) for this disease have close relatives in this country, and in at least one instance the Asiatic host is present and widespread in the United States. This investigation has had as its object the determination of the possibility of the transmission of the disease to man by these native organisms. The study is being continued because of its importance from both health and international standpoints.

Dengue Fever.

In September and October, 1922, Passed Asst. Surg. Charles Armstrong was detailed to Monroe, La., for the purpose of making certain studies of dengue fever in that place.

Attempts were made to transmit dengue fever by means of the blood of patients in various stages of the disease to guinea pigs, rabbits, white rats, and Rhesus monkeys, but these attempts were unsuccessful. The animals were under observation from 8 to 30 days in various cases. In no instances was the behavior of the injected animals different from that of the controls. Blood counts were made in monkeys, rabbits, and rats, but no significant variations were noted.

Food Poisoning.

The studies of food poisoning were continued by Epidemiologist J. C. Geiger during the year 1923 in cooperation with the University of Chicago, Prof. E. O. Jordan, of the department of hygiene and bacteriology of that university having been designated as consulting hygienist of the service to have charge of the investigations. The term "food poisoning" includes poisoning by food contaminated with bacterial organisms of the paratyphoid or other similar groups and intoxications caused by the poison produced by *B. botulinus*. These conditions are important from a public health standpoint on account of the considerable number of cases attributed to this source, the fact that they are apt to occur in small epidemics accompanied by sensational features and sometimes fatal results, the additional fact that erroneous and often unjust conclusions may be arrived at if the investigation be not timely and careful, and finally because it is possible to prevent certain classes of these outbreaks by suitable measures. Poisoning due to fungi, "milk sickness," animal parasitic and dietary deficiency diseases are not here considered under the term "food poisoning."

An analysis has been made by the service of 749 outbreaks, involving 5,210 persons, reported during the past 11 years as due to food poisoning. Following are some of the findings:

1. The original diagnosis was not borne out by approximately 28 per cent of the clinical data secured on 212 outbreaks reported as food poisoning.
2. The infectivity rate in the outbreaks of proved food poisoning varied from 75 to 100 per cent of those exposed.
3. In 87 of the 749 outbreaks the food was regarded as "spoiled" or "off" in taste and odor at the time it was eaten.
4. Epidemiologically the incubation period offers the best information for the differentiation of botulism and general food poisoning, the greater number of cases of botulism occurring after 24 hours and of general food poisoning before 24 hours.
5. All of the cases of botulism investigated during the past year were in western States and were reported to be caused by home-canned products.

The investigations have disclosed the need for fuller and better reporting, and for the statistical regrouping and classification of the mortality from food poisoning.

Malaria Investigations.

The service has continued the investigation of malaria during the fiscal year 1923 (*a*) because malaria is a serious health problem in many parts of the United States; (*b*) because of its unusual economic importance to the entire country through its hampering effects on agriculture and other industries; and (*c*) because the methods best suited to the control of malaria in rural communities of the United States have not yet been fully determined. These investigations were conducted in the field under the direction of Surg. L. D. Fricks, with headquarters at Memphis, Tenn. In broad terms, the subjects investigated during the fiscal year were: (1) Malaria prevalence in the United States, (2) malaria control methods, (3) health and economic importance of malaria, (4) life habits of malaria mosquitoes and factors influencing their production and infectivity, and (5) malaria plasmodia.

It has been found advantageous by the service to approach the malaria problem from two different angles of study, that of purely scientific investigations conducted in the laboratory and field, and that of practical studies of malaria as a health problem carried on in cooperation with the State and local health authorities concerned. This dual plan of study had tended to maintain these investigations on a plane of thorough scientific research and at the same time make them of practical usefulness to the people concerned in malaria control.

I. *Studies of malaria prevalence in the United States.*—The first questions raised in a study of malaria are: How much malaria is there in the United States? Where does it occur? How serious a health problem is this disease to the people of the country? The answers to these questions are peculiarly difficult in the case of this disease. Malaria presents itself under various guises; is often difficult to diagnose, and many persons who have malaria never consult a physician. Hence, malaria is not reported to the health authorities

with that degree of precision necessary in collecting vital statistics of value, and naturally no accurate figures are available showing its distribution in the United States. It is well known that malaria once covered a much greater area in this country than it does now, but it is not generally known that an increase has recently occurred in many sections of the country and that it is spreading into some of the Western and Southwestern States in the wake of irrigation and reclamation projects.

The service has studied the problems involved in determining the prevalence of malaria in a community, the conditions under which it is spreading in the United States, and the injurious effects of malaria, by different methods and in many places. An officer trained in the epidemiology of diseases has been assigned to these studies. Morbidity and mortality reports have been collected wherever malaria is a reportable disease. These reports have been carefully studied with a view to ascertaining its distribution in the United States and stimulating the more accurate diagnosis and more careful reporting of the disease. It is gratifying to note that considerable progress has been made toward the accurate reporting of the disease in many States during the year. In studying the different methods employed in determining the amount of malaria present in a community 69 rural schools were visited and 1,169 school children were examined for malaria infection by: (1) Questioning for histories of previous infection, (2) examining for enlarged spleens, (3) examining blood specimens for malaria plasmodia. It was found that where malaria abounds the enlarged spleens of school children serve as an easily obtainable and generally accurate index of the degree of infection present among the entire population, but in lightly infected localities splenic enlargement is not a reliable index. As a part of this study and as an aid to more accurate diagnosis, 4,918 blood slides were examined at the laboratory at Memphis, Tenn., and in the field of which 290 showed *P. falc.*, 297 *P. vivax*, and 2 *P. malariæ*.

In cooperation with service officers making field investigations in child hygiene, a study was made of the effects of malaria upon the physical development and mental activity of school children in Dunklin County, Mo. It was found that while this disease is a factor in retarding the normal growth and mental activity of children, it is difficult to determine exactly its injurious effect upon the growing child.

II. *Special field studies.*—In conducting special studies of malaria four field laboratories were located at selected points easily accessible to malaria cases and mosquito material. The field laboratory at Brewton, Ala., was continued during the summer of 1922 and was then transferred to Crowley, La. The field laboratory at Florence, Ala., was continued in operation during the summer of 1922 and was transferred to Badin, N. C., early in 1923. Separate reports covering these special field studies have been prepared and published from time to time, and therefore only the most important studies and the progress which has been made in them will be briefly summarized here:

Larvicide investigations: The investigations of Paris green as a mosquito larvicide were continued and demonstrations of its practical utility were made at many places. At Lake City, Fla., it was successfully employed on a large scale to control mosquito production in

two lakes covered with aquatic vegetation. It has been found that Paris green is especially applicable as an anopheline larvicide to places not easily drained and so covered by vegetation as to render them unsuited to other methods of control. Its use is recommended in such places because of its cheapness, portability, and ease of distribution. No harm should follow its use when simple precautions are taken. Investigations of common larvicides containing cresol were continued, some of these being widely advertised proprietary preparations. A considerable variation of efficiency was found in this class of larvicides, dependent upon the amount of pollution present in the water treated. In highly polluted waste waters cresol larvicides can not be depended upon.

Biochemical studies of mosquito-producing areas: Observations were continued on the effects of plant life, decaying vegetation, and hydrogen-ion concentration on mosquito production and mosquito infectivity. It appears that small, as yet unrecognized, differences in the intrinsic character of mosquito-producing waters have an important bearing upon mosquito production. The hydrogen-ion concentration does not seem to be an important factor with the common species of Anopheles, since they are found breeding in waters varying from pH_5 to pH_8.

Rice field studies: For several years the Public Health Service has conducted investigations of the relation of rice culture to the production of malaria-carrying mosquitoes and the prevalence of malaria. These investigations were conducted at Stuttgart, Ark., in 1922 and at Crowley, La., in 1923. In these localities prolific production of anopheline mosquitoes is found connected with rice culture, without an unusually high prevalence of malaria. The reason for this condition has not been determined.

Observations on seasonal prevalence and winter habits of anopheline mosquitoes: Observations on the seasonal prevalence of the three common species of Anopheles—*A. crucians*, *A. punctipennis*, and *A. quadrimaculatus*—were continued and previous findings were confirmed. In the malarious regions of the southern United States either *A. crucians* or *A. punctipennis*, or both, usually predominate, or are relatively more abundant during the spring and early summer months than later in the season, while *A. quadrimaculatus* is the predominating species in July, August, and September. This general statement is based on observations made in widely scattered localities of the South, but exceptions may occur. It was found that *A. crucians* is by no means limited to the coastal regions of the Southern States. Mosquito surveys were made during the winter months in Arkansas, Tennessee, Mississippi, Georgia, Alabama, and Louisiana, and it was found that south of the thirty-second parallel Anopheles larvæ and pupæ occur in sufficient abundance materially to supplement the overwintering adults in furnishing the early spring broods of anopheline mosquitoes. This apparently is not the case in west Tennessee, eastern Arkansas, northern Alabama, and northern Mississippi, where few Anopheles larvæ or pupæ were found during the winter months. *A. walkeri*, a species of the Anopheles heretofore considered extremely rare, was found in considerable numbers on Ship Island, Mississippi Sound, and breeding freely in water hyacinth-covered waters near Crowley, La.

Anopheles punctipennis investigations: The investigation of the relative importance of this species of Anopheles in transmitting malaria under natural conditions was continued from the field laboratory at Florence, Ala. *A. punctipennis* and *A. quadrimaculatus* adults were collected in this vicinity, in and around houses occupied by persons known to have malaria. From this collection 676 *A. punctipennis* were dissected, none of which was found infected. Four hundred and fifty-four *A. quadrimaculatus* were dissected, of which 17 were found infected. Thus one more observation is added to others similar in purport, all indicating that under natural conditions *A. punctipennis* is relatively much less important than *A. quadrimaculatus* as a carrier of malaria.

Seasonal variation of malaria types: It is a common observation that in the southern United States the benign tertian type of malaria predominates in the spring and early summer, while the malignant tertian or æstivo-autumnal type increases as autumn approaches. This interesting variation in malaria types is being studied by the collection of data from diagnostic laboratories all over the South and by carefully studying the blood picture of selected cases.

Studies of mosquito repellents: The pressing need for some practical method of protecting the dwellers in poorly constructed tenant cabins in the South from malaria-carrying mosquitoes has long been felt. The most common type of house found in rural districts of the South can not be effectually screened, and the other measures employed for keeping mosquitoes away are unreliable. A series of experiments conducted with creosote oil, such as is commonly used in creosoting heavy timbers, revealed that when creosote oil is applied to the inner walls of these houses, in quantities of 1 gallon to 420 square feet, it will repel anopheline mosquitoes, in some instances for months. Apparently this is a cheap, simple, and effective method of securing protection from malaria-carrying mosquitoes of enormous value to the plantation owners and farm laborers of the southern United States.

Fish investigations: The Bureau of Fisheries has continued to cooperate with the Public Health Service in the investigation of fish as a means of mosquito control. Observations on the life habits of *Gambusia affinis* were conducted in the vicinity of Augusta, Ga. Valuable improvements were made in the methods of handling and transporting Gambusia. Inspections of Gambusia hatcheries installed in connection with many impounded water projects in the South were made from time to time by representatives of the Bureau of Fisheries and the Public Health Service and advice given relative to their installation and maintenance. It appears that the construction of fish hatcheries at properly selected points and the propagation of Gambusia previous to the impounding of water may frequently be a most important measure in controlling mosquito production in impounded waters during the period of greatest danger; that is, the two or three years immediately following the impounding of the water, during which the local biologic equilibrium is being reestablished.

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III. *Cooperative demonstrations of malaria control.*—In June, 1919, the Public Health Service, the International Health Board, and the health officials of 10 States entered into a cooperative agreement under which demonstrations in malaria control were made. Three other States entered into the agreement at a later date. The purpose, extent, and progress of these demonstrations have been previously reported in the annual reports of 1920, 1921, and 1922. Under this cooperative agreement demonstrations in urban malaria control were made at 100 urban centers, located in 11 different States. The area covered by these demonstrations was approximately 385 square miles. The population protected totaled 452,420; the total expenditures for mosquito control during the first year in these 100 towns was $317,729.30; the average cost for the first year's work was 70 cents per capita, or $1.29 per acre. The cost of maintenance during the second year of work averaged 24 cents per capita, or 39 cents per acre. The funds expended in making these demonstrations were furnished by the communities themselves, the State health departments, and the International Health Board. The Public Health Service directed the demonstrations during the first year, made such inspections and furnished such advice as necessary to insure proper maintenance during the second year, and turned the completed demonstrations over to the local authorities after the second year's work was ended. Tables showing the details of these cooperative demonstrations up to June 30, 1922, were published in the annual report of 1922. The accompanying tables are intended to complete these figures through the calendar year 1922, at which time the cooperative agreement was discontinued.

TABLE A.—*Cooperative urban demonstrations begun in 1921.*

State.	Number of demonstration towns in 1921.	Area controlled (square miles).	Population protected.	Cost, initial year (1921)			Number of towns continuing work in 1922.	Actual expenditures, second year (1922).[1]		
				Total.	Per acre.	Per capita		Total.	Per acre.	Per capita.
Alabama	4	4	3,871	$2,673.27	$1.04	$0.69	4	$1,270.00	$0.49	$0.33
Arkansas	2	7	6,700	3,563.31	.80	.53	1	800.00	.42	.30
Georgia	2	9	6,560	4,741.00	.82	.72	2	1,174.50	.20	.18
Louisiana	1	10	15,000	4,965.13	.78	.33	1	4,375.07	.68	.29
Mississippi	5	15	14,088	12,361.54	1.29	.88	5	3,986.98	.41	.28
North Carolina	1	3.5	2,000	6,234.23	2.79	3.12	1	600.00	.27	.30
South Carolina	2	8.5	3,788	5,729.60	1.05	1.51	2	1,250.00	.23	.33
Tennessee	2	8	9,100	4,736.97	.93	.52	2	1,354.61	.26	.15
Texas	7	15.5	11,523	6,989.44	.71	.61	7	864.00	.09	.08
Total	26	80.5	72,630	51,994.49	1.01	.72	25	15,675.16	.32	.23

[1] The difference between estimated costs, as given in the 1922 annual report, and the actual costs is due in part to changes in labor rates but mainly to the degree of cooperation obtained from the public in connection with the control of mosquito breeding on private premises.

NOTE (revised).—This table shows actual expenditures for second year's work (1922) instead of estimated costs. It revises last three columns of Table B of 1922 annual report.

TABLE B.—*Cooperative urban demonstrations begun in 1922.*

State.	Number of towns.		Area controlled (square miles).	Population protected.	Actual expenditures initial year (1922).[1]			Expended July 1, 1922, to Dec. 31, 1922.
	Surveyed.	Selected.			Total.	Per acre.	Per capita.	
Alabama	49	3	26.5	65,880	$33,751.26	$1.99	$0.51	$17,901.22
Arkansas	6	4	10	26,103	3,761.38	.58	.14	1,197.88
Georgia	6	3	12.5	14,219	4,648.39	.58	.33	2,624.15
Illinois	6	1	6	6,267	1,598.53	.42	.25	1,135.46
Louisiana	4	1	1.32	3,385	2,785.20	3.29	.82	2,573.48
Mississippi	13	5	16.25	27,102	7,493.02	.72	.28	5,214.23
South Carolina	7	5	29	5,401	27,528.84	1.48	5.09	7,836.95
Tennessee	8	2	3.5	6,247	1,830.96	.82	.29	1,830.96
Virginia	5	5	7	25,456	21,219.61	.83	4.73	13,329.29
Total	104	29	112.07	180,060	104,617.19	1.45	.58	53,643.62

[1] The difference between estimated costs, as given in the 1922 annual report and these actual costs is due in part to changes in labor rates but mainly to the degree of cooperation obtained from the public in connection with the control of mosquito breeding on private premises.

NOTE (revised).—This table shows actual expenditures for initial year's work (1922) instead of estimated expenditures, as given in Table C of 1922 annual report.

TABLE C.—*Table showing the first year's costs of 100 cooperative malaria control demonstrations conducted in 1920, 1921, 1922, in 11 Southern States.*

Year.	Number of towns.	Total cost.	Cost per square mile.	Area protected (square miles).	Population protected.	Cost per capita.	Cost per acre.
1920	45	$161,127.62	$839.65	191.9	199,730	$0.81	$1.31
1921	26	51,994.49	645.89	80.5	72,630	.72	1.01
1922	29	104,617.19	933.50	112.07	180,060	.58	1.45
	100	317,739.30	826.43	384.47	452,420	.70	1.29

NOTE.—After the first year's work is properly accomplished, the average maintenance cost per acre for subsequent years is about 30 per cent of the first year's cost.

The results which followed these cooperative demonstrations in malaria control were immediate and impressive. At the time they were begun no properly organized effort was being made to control malaria anywhere in the United States. No State health department had organized a division of malaria control nor secured an allotment for fighting this insidious disease. The States were willing but lacked funds and trained personnel, the people were not awake to the importance of malaria control or did not know how to go about it. As a result of these cooperative demonstrations, appropriations for malaria control were secured and divisions of malaria control were created by 11 State health departments and many full-time county health units were organized as the direct result of successful malaria control demonstrations. Each demonstration served as an educational center and stimulus for better health protection to the people for miles around, and popular interest in malaria control has been spread thereby throughout the Southern States, as shown by the number of communities appealing to their State health departments for assistance in fighting malaria mosquitoes or undertaking antimosquito campaigns for themselves. The cooperative agreement under which these highly successful demonstrations were conducted was discontinued at the end of 1922, because it was felt that

the people had been so thoroughly educated in urban malaria control that they would demand it of their health authorities where needed and support it for themselves.

IV. *Studies of rural malaria control.*—The principles of malaria control in urban communities having been successfully demonstrated, the next important step toward the control of malaria in the United States was to determine how far these principles are applicable to rural malaria control and what alterations in the methods employed in urban malaria control are necessary in order to formulate a practical working program for rural malaria control in the United States. From the beginning of cooperative urban demonstrations three years ago it was expected that service investigations would take this natural direction. For this reason the demonstration towns had been selected with a view to extending the investigations of malaria control into the surrounding rural districts, and hence it was possible to continue the investigations of malaria control in most instances in the same locality without interruption by merely shifting the field personnel from urban demonstrations to rural investigations. The study of rural malaria control has been undertaken in 24 counties located in 6 States. The county is considered the unit of study because it is the unit of government in the South, and whatever methods of rural malaria control are found successful must be applied by county health organizations. These investigations having been only recently undertaken, it is impossible to give a report of results at the present time. The general program of rural control investigations is to locate malaria foci in the county; locate mosquito-breeding areas and study mosquito production; study drainage of the county, make drainage maps, determine best drainage program for county, establish grades and encourage small drainage projects by individual farmers; investigate and encourage screening where applicable; study mosquito repellents and larvicides, particularly creosote oil and Paris green; study fish control and encourage the stocking of ponds and streams with gambusia; conduct studies of other factors applicable to rural malaria control and check the actual results accomplished under local conditions. These studies are to be conducted in close cooperation with the county health officials.

V. *Studies of railroads in relation to malaria.*—Because of their close contact with agricultural and industrial communities, the railroads traversing malarious regions afford a particularly favorable opportunity for the study of the economic importance of malaria. The investigation of this subject was continued during the fiscal year. Malaria surveys were made on the Seaboard Air Line Railway and the Rock Island lines. These surveys included: (1) A determination of the malaria prevalence among the railroad employees; (2) an investigation of the malaria incidence in the territory along the railway; (3) a study of the direct and indirect losses from malaria to the railroad and to industrial plants shipping over the railroad; (4) recommendations for a practical malaria control program by the railroad, together with an estimate of its cost; (5) coordination of the railroad's program with that of the State health department concerned. The survey of the Seaboard Air Line Railway covered the lines in South Carolina, Georgia, Florida, and Alabama. It was found that of the 1,116 employees interviewed 19 per cent gave histories of chills and fever at some time during the previous year, 1922.

Of these, 82 per cent were incapacitated for work, losing an average of 8.1 days per man, About 50 per cent applied for and received medical attention. The territories along the Seaboard Air Line Railway which gave the highest death rates from malaria showed the least agricultural development. A program of malaria control by the railway, embracing protection of employees and cooperation with communities along the railroad, was outlined. The estimated annual cost of such a program was $13,700.

The malaria survey of the Rock Island lines covered that portion of this system extending through eastern and southern Arkansas and Louisiana. It was found that the cost of hospital and outpatient treatment of employees having malaria during 1921–22 was approximately $15,000. The hospital admission rate for malaria among employees on these lines during the same period was 42.1 per thousand. Floating gangs of laborers showed by far the highest malaria rates, station and office employees the lowest. Employees of this road on the relatively small part of it surveyed spent 2,329 days in hospitals during 1921–22 because of malaria.

As a result of malaria surveys conducted on six railroads, the following statements are apparently well within the facts: Operating costs are considerably increased on railroads traversing malarious regions by reduction of efficiency of labor, by reason of high turnover in labor, and by delay of urgently needed repairs—all as the result of malaria. The cost of hospitalization and medical care of malaria cases would finance an adequate malaria control program on any of the railroads surveyed by the Public Health Service. Indirectly the railroad's losses from malaria through undeveloped freight revenues are many times greater than the direct losses from causes mentioned above.

VI. *Studies of highways in relation to malaria.*—"Man-made malaria"—that is, malaria caused by man's interference with natural drainage—has frequently followed highway construction in many parts of the United States. Because of the recent impetus given to the building of good roads, this subject has been considered of sufficient importance to warrant special study at this time. The matter was taken up with the Chief of the Bureau of Public Roads, with the district engineers of this bureau located in the South, and with the various State health officers and State highway engineers concerned. The importance of placing culverts low enough so that they will drain all possible mosquito-producing areas near by and the abolition of all roadside borrow pits was pointed out to those in charge of highway construction. It has been found that these details, so important from a health standpoint, are much better taken care of on those highways constructed under the Federal highways act than is the case with the roads which are being built by county road commissioners. Effort is being made to impress county commissioners and road supervisors with the importance of roadside drainage.

VII. *Studies of impounded water in relation to malaria.*—One subject which has attracted the attention of the service since the investigation of malaria was begun in 1912 is that of impounded waters. This problem has been studied each summer, except during the war period, so far as a limited allotment would permit, by making malaria and mosquito surveys around many impounded water projects, by

comparing mosquito production and malaria prevalence around the same project from year to year, and by noting the results accomplished in mosquito control by different measures employed for this purpose. It was not until the present year, however, that the service was able to undertake this study as a distinctive feature of malaria investigations. Owing to the rapid development of the water-power resources of the Southern States which has recently taken place and because the impounded water projects required in developing this power are in many instances located in potentially malarious regions and adjacent to territory known to be infected, it was felt that the study of impounded water in relation to malaria ought to be conducted without interruption. A letter was addressed to the different State health officers concerned asking them for lists of impounded water projects recently installed or contemplated within their respective States. A report of 140 such projects was received. Two officers were assigned to this study, one in North Carolina and the other in Alabama, because of the importance of impounded water projects in these two States. It is expected that certain impounded water projects will be kept under continuous observation for a period of several years, and that this method of study will serve to confirm and check the observations already made by officers in their periodic surveys of such projects.

The object of these studies is to determine how the enormous water power of the South can be utilized without needless restraint on one hand or injury to the health of the people on the other, by determining what practical measures should be taken to prevent the production of mosquitoes and the spread of malaria around these impounded water projects. It appears at the present time that the most important principles involved in preventing prolific mosquito production and the spread of malaria around these projects are: Prevention of spread of malaria among the imported laborers; clearing away of all growth which would stand above the water surface; prevention of floatage on the pond; keeping the banks just above and below water line clean; adequately stocking the impounded water with top minnows. As an aid in carrying out these principles of malaria control around impounded water projects, the service has made general suggestions to the Federal Power Commission and to the different State health authorities concerned:

Wherever impounded water projects are to be located in those parts of the United States in which malarial fevers exist, or malaria-bearing mosquitoes are known to propagate, the following general measures should be enforced for the protection of the public health:

(*a*) All laborers employed in the construction of the dam and the impounding of the water should be housed in properly screened houses and such steps taken by quinine administration and control of mosquito production in the vicinity of the camps as may be necessary to prevent the infection of malaria mosquitoes and the introduction of malaria into this locality.

(*b*) In the area to be occupied by the reservoir, its branches, and indentations, all tree stumps and underbrush should be cut sufficiently near the ground to prevent their standing above the surface of the water at any and all stages of the water, thus preventing them from holding drift and floatage. All logs, brush, trees, and other loose objects which, if not removed, would float at the surface of the impounded water and thus constitute conditions favorable to malaria mosquito production, should be removed.

(*c*) The formation of log jams and the collection of drift and floatage in narrow valleys or indentations and along the banks of the reservoir where wave action is absent or weak should be prevented during the mosquito season.

(*d*) In so far as practicable, the water level in the reservoir should be fixed so as to reduce to a minimum shallow, submerged areas on which aquatic plants will grow and reach the surface of the water.

(*e*) When practicable the water level in the reservoir should be held 3 feet above normal high-water level from December 1 to May 1, but where this method of clearing the banks is impracticable, the entire shore line of the reservoir for 15 feet back from normal high-water level should be cleared of all brush, trees, stumps, logs, and undergrowth before the water is impounded.

(*f*) The reservoir should be adequately stocked before the first mosquito season with top minnows which feed upon mosquito larvæ, and every effort should be made to protect them against their enemies and secure their successful propagation.

(*g*) All separate pools and seepage places created during the construction of the dam or by the impounding of the water, whether adjacent to the reservoir or situated in the stream bed below the dam, should be filled, ditched, oiled, or stocked with top minnows (gambusia) in order to prevent mosquito production.

It should be understood that these are general suggestions and that the study of impounded waters is incomplete. It is felt that each impounded water project presents a problem of its own which can be determined and regulated only by making a careful preliminary malaria survey of the local situation. It is reasonable to expect that as a result of the studies which are now being made of impounded waters, it will be possible to develop the enormous water power of the Southern States without endangering the public health by the increase of malaria in the vicinity of these projects.

Malaria control around Government hospitals.—The supervision of malaria control operations around certain Government hospitals in which disabled soldiers were furnished hospital care by the Veterans Bureau was continued this year. Early in 1923 it was found that supervision of malaria-control operations from this office was no longer necessary except at Hospital No. 27, Alexandria, La., Hospital No. 63, Lake City, Fla., Hospital No. 84, Algiers, La., and Hospital No. 25, Houston, Tex. Supervision of this work was continued by the Public Health Service at these hospitals at the request of the Director of the Veterans Bureau. The other Government hospitals, around which control operations had been supervised from malaria field headquarters, were furnished advice from time to time relative to their mosquito-control problems.

Malta Fever.

In October, 1922, in response to a request from the Governor of the State of Arizona, Passed Asst. Surg. G. C. Lake was detailed to cooperate with the State health authorities in the investigation of an outbreak of Malta fever in Phoenix and its occurrence in the State in general. The important facts obtained in connection with the investigation are as follows:

Cases of a peculiar febrile disease began to appear in Phoenix about the middle of May. The positive diagnosis of the disease as Malta fever was not made until August 3, when the results of the tests at the Hygienic Laboratory were reported. By the end of September more than 30 cases had been located. The investigations showed that all but three of the patients had drunk goat's milk supplied from the same dairy, and it was possible that these three had also been infected from the same source. Tests made on the goats supplying the milk gave 18.3 per cent positive for Malta fever. It was found that Malta fever had occurred in several widely separated areas in Arizona.

It is extremely difficult to recognize Malta fever early in the course of an outbreak from the clinical symptoms alone. The prohibition, or at least stringent control, of the sale of goat's milk in cities where an ample supply of cow's milk is available should be seriously considered by health officers. Where it is necessary to allow the sale of goat's milk to secure sufficient fresh milk, efficient pasteurization under constant supervision by the health authorities should be required.

Pellagra.

In the field investigations of pellagra the following studies were continued, under the direction of Surg. Joseph Goldberger, during the fiscal year 1923:

(1) A study of the preventive value of certain food factors; (2) experimental feedings in dogs and rats; and (3) study of the data collected during the period 1917–1921 bearing on the relation of various hygienic and economic factors to pellagra incidence in selected cotton-mill villages of South Carolina.

The study of the preventive value of certain essential food factors at the Georgia State Sanitarium, which were carried on along the same general lines as in the previous year, related to the rôle of the known vitamins and to protein or some as yet unknown factor of diet in combination with protein. The indications are that the known vitamins are not essential factors in the prevention of pellagra. There is reason to expect that definite results in regard to the part played by the proteins will be obtained as a result of the investigations now planned and under way.

Valuable results are beginning to appear as a result of the experimental feeding of dogs and rats in progress at the Hygienic Laboratory.

Early in the fiscal year a cooperative arrangement was made with Yale University to increase knowledge of diet and nutrition in the maintenance of health and prevention of disease. While it is too soon to estimate the value of the results of this line of study, the outlook is encouraging.

Progress has been made in the study of data bearing on the relation of various hygienic and economic factors to pellagra incidence in selected cotton-mill villages, collected during 1917–1921.

Rat Flea Survey.

During the year a survey was begun by the service, intended to disclose facts with regard to the incidence and varieties of fleas found upon rats in various United States ports, which might be expected to have important bearings upon the possibility of the spread of bubonic plague, in case of its introduction, and upon the protective and eradicative measures to be planned. The survey is to include the collection, enumeration, and identification of the rat fleas in widely separated ports and at different seasons. Up to the end of the year too small a number of fleas (about 3,000) had been examined to warrant any general conclusions, but the results indicate that the survey is destined to contribute interesting and valuable information.

Rocky Mountain Spotted Fever Investigations.

During the past fiscal year, studies of Rocky Mountain spotted fever have been continued in the Bitter Root Valley of Montana with headquarters at Hamilton, and at the Hygienic Laboratory in Washington through the winter. Surg. R. R. Spencer has been in charge of the investigations under the supervision of the Director of the Hygienic Laboratory. The following statements briefly summarize the progress made:

1. Last year it was shown that the virus of Rocky Mountain spotted fever may occur in ticks in a noninfective stage which can be rendered infective by permitting the ticks to feed two or more days. The supplementary observation has been made that incubation of such ticks at 37° C. for short periods will bring about the same result.

2. In animal tissues, the virus has been found to live for two months when preserved in 100 per cent glycerin at very low temperatures.

3. Studies upon the morphology, virulence, viability, and distribution in ticks of the organisms described by Wolbach as the causative agent of Rocky Mountain spotted fever are in progress, but are not completed.

4. The routine testing for infection of unfed adult ticks, ticks from wild animals, and of animal blood is being continued over two seasons in order to obtain further information relative to the prevalence and distribution of the infection in nature. While this work has been laborious and time-consuming, it has already had a practical bearing on the control measures instituted by the Montana State Board of Entomology.

5. All attempts to culture the spotted-fever organism upon artificial media have been uniformly negative; and chemotherapy experiments, particularly with salts of bismuth, have yielded no striking results.

6. Field studies in Idaho by Special Expert Parker have shown that the prevalence of spotted fever has markedly decreased during the past eight years and that as compared to conditions in the Bitter Root Valley of Montana there are fewer species of susceptible rodents. Rabbits were observed to be the most numerous species, and the passage of the virus through a single or comparatively few species may account for the low virulence of the disease in this State.

7. One hundred and fifty-two persons have been vaccinated with Doctor Noguchi's sero-vaccine for experimental purposes. Its value is yet to be determined.

8. As a by-product of spotted-fever studies, (*a*) ectoparasites, other than ticks, were collected from animals brought to the laboratory. Five new species and one new genus of fleas have been described by Entomologists Dunn and Parker; (*b*) *Bact. tularense* has been recovered from ticks, grown on artificial media (cystine agar) and inoculated into guinea pigs. These animals died in a few days, showing at autopsy the typical lesions of tularemia.

9. Ticks from sheep suffering from tick paralysis and in one instance a tick from a human case of paralysis have been studied. Guinea pigs remained unaffected when such ticks were permitted to feed upon them for periods as long as seven days. Upon careful dissection of the same ticks, no characteristic organisms could be demonstrated.

Smallpox.

Denver, Colo.—Virulent smallpox was present continuously in Denver during 1922. From November, 1921, to December 31, 1922, there were 935 cases with 248 deaths. The disease almost disappeared during the summer, only to break out with greater activity in the fall. In November, 1922, the situation became so critical (84 deaths occurring in one week) that the city and State health authorities requested aid from the Public Health Service. Passed Asst. Surgs. T. A. Parran and G. C. Lake were detailed to assist in controlling the epidemic and to study its character. They believe the high death rate was the result of a highly virulent infection in a poorly vaccinated community, the low incidence of vaccination being due to the prevalence for years of smallpox of very low virulence, together with inadequate laws regarding vaccination. Striking evidence was present that vaccination protected completely even against the virulent smallpox seen in Denver.

Tuberculosis.

Upon request of the Governor of Porto Rico a tuberculosis survey of the island was conducted for a number of months during the past year under the direction of Surg. J. G. Townsend. A report of the findings will be published as a Public Health bulletin. Following is a brief summary of some of the observations: The tuberculosis death rate is a little more than 200 per hundred thousand, the laboring classes being more severely affected than the well to do. A comparative check by name of all the reported cases and reported deaths from tuberculosis in Porto Rico during the last two and one-half years showed that 60 per cent of the tuberculosis deaths had never been reported as cases. In the industrial cities on the practically level coast belt the tuberculosis death rate averages about 8 per cent of the total death rate; in the mountainous central portion it is less, averaging about 4 per cent, except in certain industrial towns, especially those dependent on the tobacco industry. These high rates are due to the conditions under which the poorer classes live. A survey of more than a thousand houses occupied by the laboring classes in seven of the larger cities on the island reveals that practically all of them consist of two rooms, and shelter an average of six persons. Each room has an average floor space of less than a hundred square feet, and it is the custom to keep the one window and the door closed all night. The usual diet of the people is conducive to the prevalence of tuberculosis. Both the housing and the diet are due chiefly to the economic conditions. Recommendations were submitted in regard to the holding of tuberculosis clinics by Porto Rican cities, for the establishment of a follow-up system and social service through public health nurses, the supplying of free sputum cups, better reporting of cases, increased hospital accommodations, education of children along health lines, and the working out of a wage scale that will give the laborer a chance to preserve his own life and the lives of his family.

Typhoid Fever.

Covington and Newport, Ky.—Upon request of the State health officer an investigation of an epidemic of typhoid fever in Covington and Newport, Ky., was conducted by Sanitary Engineer J. K. Hoskins in April, 1923. Approximately 10 days were spent in making personal surveys of the water and food supplies, securing histories of typhoid cases, endeavoring to secure more thorough reporting of cases by physicians, and in collecting samples of water for bacteriological analysis. A total of 99 cases, with 9 deaths, were located. The epidemic was found to be due to the public water supplies of both cities. Raw Ohio River water had been used, with limited storage followed by chlorination, by Covington, while Newport supplied imperfectly coagulated water with no chlorination. Recommendations for temporary and permanent relief were made to the State health officer and to the local authorities.

Industrial Hygiene and Sanitation.

During the fiscal year 1923 the activities of the office of industrial hygiene and sanitation were continued under the direction of Surg. L. R. Thompson. They include (1) surveys of occupational health hazards; (2) studies of occupational diseases; (3) studies of the causes of industrial absenteeism; (4) cooperation with Government departments; (5) cooperation with industrial and other agencies; (6) investigations of the artificial and natural ventilation on steamships, the use of cyanogen chloride as a new fumigation gas; and (7) miscellaneous activities.

I. SURVEYS OF OCCUPATIONAL HEALTH HAZARDS.

A. AIR CONDITIONING AND DUST CONTROL.

During the year Asst. Sanitary Engineer (R) Leonard Greenburg continued the studies in air conditioning, under the immediate supervision of Consulting Hygienist C.-E. A. Winslow, at Yale University, New Haven, Conn. The results of these investigations were published in the Public Health Reports, July 28, 1922, under the title, "Efficiency of various kinds of ventilating ducts."

It was considered advisable before entering upon intensive studies of various classes of dusts as occupational health hazards to undertake a careful comparative study of the various instruments employed for dust collection. In cooperation with the Bureau of Mines, a detailed study covering approximately four months was made at the Bureau of Mines laboratory, Pittsburgh, Pa. The results of this work have been set forth in a report in which the more important types of apparatus are compared and the results of the comparison are shown graphically and mathematically. In connection with this work a new dust-collecting apparatus, which has been designated the "Impinger," was designed by Mr. Greenburg, and results have indicated that this instrument is superior to all others investigated for collecting accurate samples of various classes and concentrations of dust.

B. DUST IN INDUSTRY.

In conformity with the plan of the office of industrial hygiene and sanitation to investigate general health hazards rather than hazards of special industries, a thorough investigation was begun of the effects of various classes of dust on workers engaged in those industries in which dust is the principal health hazard. Units have been established at Hagerstown, Md., for the study of cement dust; Wilkes-Barre, Pa., for the study of hard-coal dust; Meriden, Conn., for the study of silver polishing; and cooperative work has been begun at Wyco, W. Va., in the study of soft-coal dust. During the coming year it is expected that units will be established at Barre, Vt., for the study of silica dust, and at some felt-hat industry, not yet designated, for the study of animal dust.

Each unit is composed of a physician, a nurse, and a clerk; and for all the units together, two physical chemists are attached for dust analysis and ventilation studies. The plan of work in each unit is the same and consists of—

(*a*) Physical examinations of a group of workers in occupations exposed to the particular dust under study, including X-ray serial examinations of the chest; (*b*) establishment of absentee records for the group under study, with special reference to the amount of time lost from work on account of sickness, particularly sickness due to respiratory diseases; (*c*) careful job analysis, with a determination of the quantity of dust each worker is exposed to, and an analysis of the dust to determine its chemical nature and the size and number of the particles contained.

C. STUDIES IN ILLUMINATION.

The studies in illumination, especially relating to the eye defects in groups of workers doing intensive eye work and to the efficiency of workers under different degrees of illumination, have been completed during the present year. Further studies relative to the efficiency of workers under different degrees of illumination will be made during the present year. The general results of the study so far are given as follows:

(*a*) The number of eye defects and the number of cases of defective vision are found to vary in a general way directly as the nature of the work process requires increased intensity of eye work, the largest number of defects and the poorest vision being found in the group of workers doing the most intensive eye work.

(*b*) There seems to be a definite relation between the prevalence of certain diseases and defects of the eye, and the amount of illumination under which similar groups of workers are occupied.

(*c*) The higher the intensity of illumination up to a certain point, the greater the rapidity with which the work is performed. The data collected seems to indicate that less fatigue is experienced, especially in the poorer vision groups under higher illumination.

(*d*) The installation of higher illumination would result in a pecuniary saving and would conserve the eyesight of employees.

Because of the importance of establishing a ratio between outdoor daylight and indoor daylight, automatic light-recording cells have been installed in the office of industrial hygiene and sanitation, and a study that will probably consume the period of an entire year has been begun.

D. STUDY OF THE PHYSIOLOGICAL EFFECTS OF HIGH TEMPERATURES AND HUMIDITIES.

Studies regarding the physiological effects of high temperatures and humidities have been carried on during the year in cooperation with the Bureau of Mines Experimental Station at Pittsburgh, under the supervision of Acting Asst. Surg. W. J. McConnell. While the studies are not completed, partial results are available on which the following observations are based:

(*a*) There is an inability of the body at rest and in still air to compensate for saturated atmospheric conditions exceeding 90° F.

(*b*) The physiological effects resulting from exposure to high temperatures and humidities depend upon both the wet and dry bulb temperature readings.

(*c*) The exhaustion and weakness following subjection of human beings to a very high temperature and humidity for a short period are not so severe as subjection to a moderately high temperature and humidity, but for a longer period.

(*d*) The highest dry and wet bulb temperatures attained and the length of time endured in the experiments are as follows:

Dry bulb.	Wet bulb.	Relative humidity.	Time, minutes.
112.5	112.5	100	35
120.2	104.02	60	40
147	108.4	30	45
157	100.43	15	45

(*e*) The pulse rate appears to be a good indication of the extent of the discomfort experienced by the subject. Subjects became very uncomfortable after the pulse rate exceeded 135 pulsations a minute and complained of unbearable and distressing symptoms when the pulse exceeded 160 a minute. The highest pulse rate recorded was 184 a minute.

(*f*) The systolic and diastolic blood pressure fell with moderate increase in temperature and humidity; and the systolic rose and the diastolic fell, thus increasing the pulse pressure, in high temperatures and humidities.

(*g*) The curve of rectal temperature shows a close parallelism with the curve of the temperature of the test chamber at any constant humidity.

(*h*) Subjection to high temperatures and humidities produces no marked change in the respiratory rate.

(*i*) Loss of weight varies with the individual, the loss increasing with the length of exposure to high temperature and with the severity of the test.

(*j*) The hemoglobin content of the blood increases proportionately to the loss in weight.

(*k*) An estimation of the changes in the sugar content of the blood proved negligible.

(*l*) A relative increase in the blood count was found but not an absolute one.

(*m*) The rate of sweating varies with the atmospheric conditions. The losses of substances from the body through the sweat change in their proportions to one another.

(*n*) Examination of the urine was negative for albumen and sugar, and the specific gravity increased.

(*o*) Sweat is the chief factor in producing irritation and inflammation of the eyes.

(*p*) Ice water, even when large quantities were swallowed, did not cause cramps under the conditions of the experiments.

II. STUDIES OF OCCUPATIONAL DISEASES.

A. PHYSICAL CONDITION OF PERSONS ENGAGED IN MAKING RADIUM EMANATIONS.

For a period of approximately one and a half years a number of persons employed in the radium section at the United States Bureau of Standards have been under the observation of Passed Asst. Surg. R. C. Williams with regard to their physical condition. Periodic physical examinations of these individuals have been made, and the blood changes have been specially studied through monthly examinations. The most important findings and conclusions arrived at in this study are—

(*a*) That at least two of the employees who were examined during the study present symptoms showing the effect of radiation on the skin of the fingers of the hands.

(*b*) That employees handling radium are exposed to radiation, as evidenced by the positive effect on dental films worn by employees in regular routine work.

(*c*) That certain blood changes occur in the workers, notably a tendency of the polynuclears to remain slightly below the lower normal limit; and a diminution of the smaller lymphocytes, while the large lymphocytes apparently run somewhat higher than normal; the total white cells have a tendency to decrease in number and so also with the total red cells.

(*d*) That unusually low blood pressures were noted in practically all employees in this work.

B. INVESTIGATION INTO THE CHEMICAL AND PHYSIOLOGICAL ASPECT OF INDUSTRIAL FATIGUE.

The study of the changes that take place in the organism exposed to high environmental temperatures, low humidities, and moderate air movements, as shown by examination of the blood, has been continued.

With an air movement of approximately 50 feet per minute and a humidity of 33 per cent, a summary of the major results obtained is presented below:

During an exposure of six hours to an environmental temperature of 20° or 30° C. there was a drop in body temperature, probably due to a decrease in muscular activity. At 40° C. there was an increase of 1° in body temperature without an initial drop. At 45° and at 50° C. the body temperature rose within an hour to such a height that it was deemed unsafe to continue the experiments.

The oxygen capacity of the blood showed no changes during exposure to the different temperatures that can not be accounted for by the diurnal changes in the hemoglobin or by the concentration of the blood due to excessive evaporation of water.

The oxygen content of the blood remained unchanged at 20° C., but showed a drop at 30° C., which fact is probably associated with the low rate of metabolism at this temperature. At 45° and 50° C. there is a slight increase in the oxygen content, due to the increased aeration of the blood at these temperatures, but this increased aeration is not in direct proportion to the increased passage of air over the membranes of the mouth and throat.

At the temperatures of 20° and 30° C. the alkali reserve, as shown by the carbon dioxide capacity, remains unchanged; while at 40° C. there is a sharp fall during the first two hours, followed by a slower fall during the next two hours. At temperatures of 45° and 50° C. there is a rapid depletion of the alkali reserve, which is almost identical for each of these two temperatures.

The carbon dioxide content follows the alkali reserve, except that at 30° C. there is a slight rise, for the same reason that the oxygen content falls.

The hydrogen-ion concentration of the plasma remains unchanged during an exposure of the animal to a temperature of 20°, 30°, and 40° C., but decreases at temperatures of 45° and 50° C., because of the excessive pulmonary ventilation at these temperatures with the consequent washing out of carbon dioxide without a compensatory loss of alkali from the blood.

The concentration of blood sugar falls during an exposure to temperatures of 20° and 30 ° C. This fall is probably associated with the inactivity of the animal during the course of the experiment. At 40° C. it falls during the first two hours, to increase during the following four hours. At 45° C. no change was noted during an hour's exposure, while at 50° C. there was a sharp rise during this time.

The blood solids at 20° and 30° C. showed only the usual diurnal changes, while at 40°, 45°, and 50° C. the concentration of the blood increased with the environmental temperature, no initial drop being seen.

There was no increase in lactic acid shown during the exposure.

When the air movement during an exposure to an environmental temperature of 50° C. was increased to 224 feet per minute, it was found that there were not only minor changes in the blood gases and carbon dioxide capacity, but an increase in the blood solids at the end of an hour, as compared with the changes that take place during the same length of exposure with an air movement of 50 feet per minute. At the end of a four-hour exposure with the increased air movement, the blood gases and carbon dioxide capacity had dropped to the same low level as had been observed at the end of an hour with an air movement of 50 feet per minute. The body temperature had risen 3° C., and it was deemed unsafe to continue the exposure. The blood solids indicate a condition of anhydremia which, in the cases of the smaller animals, results fatally.

When the animals were permitted to drink all the water they wanted during the four-hour exposure to a temperature of 50° C. and an air movement of 224 feet per minute, no changes could be noticed in the blood gases and carbon dioxide capacity. There was a drop in the hæmoglobin content and a fall in the blood solids, due to a dilution of the blood. The body temperature remained unchanged during the exposure.

C. HEALTH HAZARDS OF THE BRASS FOUNDRY TRADE, WITH SPECIAL REFERENCE TO LABORATORY STUDIES IN PRODUCING BRASS FOUNDERS' AGUE.

Field investigations in the brass foundry trades show that the principal health hazards are from poor illumination, silicious and metallic dusts, inadequate personal service facilities, and inadequate ventilation.

A specific industrial disease of the trade is "brass foundrymen's ague," and is due to exposure to zinc-oxide dust and inhalation of it.

Physical examinations were made of 212 foundry workers. Of this number 80 per cent were exposed to zinc-oxide dust. Of the men so exposed 70.5 per cent gave a history of having experienced attacks of "brass foundrymen's ague."

An analysis of the physical status of the workers exposed to the oxide shows that men affected by the dust have an average of 6.14 defects per man, as contrasted with 4.86 defects per man for those who are unaffected. The average number of defects per man increases with age and length of employment in the trade.

An investigation in a zinc-oxide manufacturing plant shows that workmen exposed to the oxide experience ill effects which are clinically identical with those of "brass foundrymen's ague"; but which differ in that, as a rule, an earlier toleration is developed.

Welders of galvanized iron, when the galvanizing process is conducted in a closed compartment, suffer from attacks clinically identical with those of "brass foundrymen's ague."

Laboratory experiments, exposing guinea pigs to an atmosphere laden with freshly made zinc oxide, show definite and consistent clinical reactions. Microscopic examination of the lungs and trachea shows definite pathological changes, consisting chiefly of an infiltration of endothelial cells and polymorphonuclear leucocytes.

Daily exposures tend to induce bronchial pneumonia. Continued exposure for from two to four hours causes death, which is due to suffocation.

During one hour's exposure to oxide a greater quantity of oxide is inhaled than is ingested. Animals killed 24 hours after exposure show that the gastrointestinal tract contains more zinc than do the lungs.

Analysis of the exposure-cage atmosphere showed that the animals were exposed only to pure zinc-oxide dust.

Normal lung tissue, even in minute quantity, is extremely toxic. A lung extract prepared from fresh lung tissue, when injected intravenously, caused death within a few seconds or a few minutes. Post-mortem findings closely resemble those noted in death following prolonged exposure to zinc oxide dust.

The lung extract, in sublethal doses, produced clinical symptoms quite similar to those induced by one hour's exposure to zinc oxide.

Zinc oxide incorporated in normal lung extract and lung extract prepared from an animal exposed for one hour to zinc-oxide dust did not show any increase in toxicity over normal, unexposed lung tissue.

Both zinc and copper were found in all the tissues and organs of normal, unexposed guinea pigs. Zinc and copper are normal constituents of vegetables and cereals, which are the sources through which the animals receive these metals. Experiments show that

both zinc and copper ingested in the food are, after distribution to the tissues, excreted through the gastro-intestinal tract, the kidneys, and the skin. Approximately 94 per cent of the zinc excreted is eliminated through the intestines and the remainder through the kidneys and the skin.

Experiments further show that there is a fair balance maintained in the tissues between the quantities of these metals ingested in the food and those excreted.

D. POSTURE IN INDUSTRY.

During the year a beginning was made of a study of the relationship between occupation and posture, and of the importance of posture in producing physical defects. The study has been divided into two sections: (1) A study of natural posture in the pre-industrial age, covering 2,000 persons from the ages of 3 to 23. (2) With a knowledge of the influence of physical defects in the formation of certain types of posture in the pre-industrial age, the work will then be carried into industry, in an effort to determine the influence of occupation in the formation of habits of faulty posture and the relationship of this posture to physical defects. Approximately 500 physical examinations were made during the year in the first section of this study.

III. STUDIES OF THE CAUSES OF INDUSTRIAL ABSENTEEISM.

Industrial morbidity statistics.—In cooperation with the statistical office, the work of developing standardized sickness records in industrial establishments having medical service for their employees was advanced. Records were installed in certain establishments in order to evaluate the effect of specific health hazards such as extreme heat, dampness, sudden variations in temperature, certain inorganic dusts, and other industrial hazards, etc. Sickness records covering all cases of disability lasting one full working-day or longer are now being kept in 18 industrial establishments employing 33,000 persons and in four Government bureaus with a combined personnel of 12,000.

Reports are being received monthly of the new cases of sickness, which are tabulated according to sickness causes, and studied currently in comparison with the morbidity experience of all the reporting establishments.

The analysis of sickness data from different industrial establishments has revealed great variations in the illness rates. While the causes of the high rates in certain establishments and of low rates in certain other plants have not yet been studied in sufficient detail to warrant definite conclusions, it appears that the differences in the crude rates are so wide as to suggest great opportunities at hand for reducing the frequency and severity of illness in industry.

In attempting to measure the effect of conditions supposed to involve hazards to health, it has been found necessary first to eliminate statistically the influence of those factors which have nothing to do with the conditions of work. What these factors are and the extent of their influence upon the sickness rate has to be known

before the influence of a given working environment can be accurately gauged. The importance of sex and age and of season have long been recognized, and certain differences attributable to race or nationality have been noted, but the possibility of length of service in a given establishment as a factor appreciably affecting the sickness rate was discovered in the course of analyzing the morbidity statistics of the B. F. Goodrich Co. These statistics were presented in an article entitled "Disabling sickness among employees of a rubber manufacturing establishment in 1918, 1919, and 1920," published in the Public Health Reports of December 15, 1922. Another interesting factor, marital status, has been found to have an appreciable influence upon the frequency of sickness among industrial employees, a subject which will be presented in the analysis of the Hood Rubber Co.'s morbidity statistics.

In a preliminary report on the health of employees exposed to various dusts in a Maryland cement plant, the effect of the physical status upon the frequency of disability was measured. It was found that illness occurred about 16 per cent oftener among persons having minor physical defects than among those having no physical defects, and about 55 per cent oftener among persons with the more serious physical defects than among those without any defects of consequence. The sickness rate, as well as the absence rate for causes other than illness, was found to be considerably higher in the cement plant than for employees of a rubber company whose health is safeguarded by a well-organized factory medical service.

IV. COOPERATION WITH GOVERNMENT DEPARTMENTS.

1. *Post Office Department.*—Passed Asst. Surg. R. C. Williams acted as liaison officer between the Welfare Division of the Post Office Department and the Public Health Service in carrying on the following activities:

(*a*) Study of the proper type of mail bag for letter carriers; (*b*) cooperation with the Bureau of Standards in testing shoes for letter carriers; (*c*) study of dust and bacteria in mail bags; (*d*) preparation of a first-aid pamphlet for post-office employees throughout the United States; (*e*) development and adoption of a cooperative plan whereby post-office employees are accorded the opportunity for physical examination in approximately 67 stations of the Public Health Service; (*f*) further tests to determine the most efficient intensity of lighting in post offices were made by Physicist J. E. Ives, in conjunction with Mr. F. W. Farnsworth, of the Post Office Department, and Mr. Clarence Petersen, of the Supervising Architect's office.

2. *The United States Bureau of Standards.*—Studies of employees exposed to the emanations of radium.

3. *Illumination surveys of Government office buildings in Washington, D. C.*—(*a*) The Post Office Department Building; (*b*) the City Post Office Building; (*c*) the Bureau of Printing and Engraving; (*d*) the Treasury Building; (*e*) the Building of the United States Civil Service Commission; (*f*) the Liberty Loan Annex.

4. *The Bureau of Printing and Engraving.*—A survey was made of the duties performed by the medical and sanitary officer in charge of the emergency room, with reference to better standardization of this character of work.

5. *The Bureau of Mines.*—The following studies in mine sanitation were carried on during the year in cooperation with the Bureau of Mines of the Interior Department, under the supervision of Surg. R. R. Sayers, detailed from the Public Health Service to that bureau for the purpose: (1) Dangers of and treatment for carbon monoxide poisoning; (2) pyrotannic acid method for quantitative determination of carbon monoxide in blood and air; (3) elimination of carbon monoxide from the blood by the use of carbon dioxide-oxygen mixture; (4) high temperatures and humidities (see p. 23); (5) petroleum gases; (6) hydrogen sulphide; (7) mine hygiene and sanitation; (8) dust and ventilation; (9) tunnel gas; (10) causes and prevention of illness among miners, and (11) standardization of methods of first-aid instruction. Cooperative studies were carried on by the Public Health Service and the Bureau of Mines with the American Society of Heating and Ventilating Engineers with regard to the physiological effects of temperatures and humidities, and the following papers have been prepared: (1) A psychrometric chamber and its uses; (2) physiological reactions to high temperatures and humidities; and (3) determining equal comfort lines. Doctor Sayers, as chief surgeon of the Division of Sanitation of the Bureau of Mines, attended a number of conferences as a member of the Commission on Resuscitation and Gas Asphyxiation of the American Gas Association.

Upon request of the city health department of Baltimore, and in cooperation with the Bureau of Mines and the Bureau of Standards, Asst. Surg. C. W. Mitchell was detailed to assist in an extended study of the cause of gas accidents. As a result of this investigation it was shown that carbon monoxide is the chief toxic substance in the gas used, that faulty tubing and connections were responsible for many asphyxiations, as were also poorly adjusted and poorly ventilated appliances, and that properly ventilated appliances present almost a negligible hazard.

6. The industrial hygiene office also gave advisory supervision and assisted in the analysis of reports of industrial medical work in the Veterans Bureau, the Bureau of Printing and Engraving, and several other bureaus of the Treasury Department.

V. COOPERATION WITH INDUSTRIAL AND OTHER AGENCIES.

1. *The American Institute of Baking.*—During part of the year an officer was assigned to the American Institute of Baking to assist in the development of an inspection service and to study the health hazards which possibly might exist in the baking industry. Surg. W. C. Witte was in charge of this work until his resignation from the service, March 16, 1923.

2. *Workers' Health Bureau.*—Physical examinations were made of 59 glass bevelers and mirror workers. Of these, 23 were cutters and roughers, 5 bevelers, 25 smoothers and polishers, 4 silverers. The group was too small for any special analysis to be made as to the effect of occupation on the health of the workers.

3. *Consulting service.*—In the course of the year numerous requests for information and advice were received from industrial establishments, industrial workers, various State and municipal boards of health, public health and welfare associations, privately operated industrial health bureaus, and Government departments, concerning

exposure to industrial health hazards, various occupational diseases, and many other questions relating to industrial hygiene and sanitation.

4. *Cooperation with the American Engineering Standards Committee.*—In cooperation with this committee, the Public Health Service, as sponsor for the preparation of an industrial sanitary code, has issued the first tentative draft of this code, which is now in the hands of the committee for revision. Passed Asst. Surg. R. C. Williams, in charge of this work, adapted the code from the best practice found in codes in this country and abroad.

VI. INVESTIGATIONS OF THE ARTIFICIAL AND NATURAL VENTILATION ON STEAMSHIPS AND THE USE OF CYANOGEN CHLORIDE AS A NEW FUMIGANT.

1. *Ship fumigation.*—Under the authority of the Surgeon General a board was convened to make an investigation of the various gases which seem to offer advantages in ship fumigation and to study the natural ventilation and the artificial means of ventilation of ships after fumigation.

In cooperation with the Chemical Warfare Service of the United States Army a series of experiments was conducted at Edgewood Arsenal with the result that a simple method of producing cyanogen chloride was found. The constituents used in the preparation of this gas are as follows:

4 ounces powdered sodium cyanide.
3 ounces sodium chlorate.
2 ounces talc.
17 fluid ounces commercial hydrocholric acid, specific gravity 1.15 to 1.20.
17 ounces water.

NOTE.—This formula is tentative and may be changed later.

The composition of the lethal concentration as expressed in milligrams per liter is as follows:

Cyanogen chloride	0. 9407
Hydrocyanic acid gas	0. 3269

This cyanogen chloride and hydrocyanic acid gas mixture has a distinct advantage over the hydrocyanic gas which has been used until the present time by the service, in that it is as efficient as hydrocyanic acid gas, and yet its content of cyanogen chloride, which is a lacrimatory agent, gives instant warning of the presence of the gas even in nonlethal quantities.

During the first half of the fiscal year over 300 ships were fumigated with this gas, and it has been found to fulfill the following requirements:

(1) Toxicity: High toxicity for rodents, bats, roaches, and bedbugs. (The amount required for lice requires further experimentation.)

(2) Detection properties: Intense lacrimation when lethal dose is used. In one-eighth lethal dose (having no harmful effect on rats after exposure of one hour) lacrimation was still extreme.

(3) No effect on foods, tobacco, fabrics, leather, and no corrosive action on metals (with the possible exception of nickel.)

(4) Efficient penetration qualities.

(5) Nonpersistence: This gas is not more persistent than hydrocyanic acid gas; probably less so.

(6) Reasonably low cost per 1,000 cubic feet. Cyanogen chloride mixture, $0.088; hydrocyanic acid gas, $0.081.

(7) Fire and explosive hazards at minimum.

The investigation of natural ventilation and artificial means of ventilation of ships after fumigation was conducted on the United States Shipping Board steamer *Hartford*. This work has resulted in a definite knowledge of the influence of winds, humidity, and temperature in connection with the ventilation of ships after fumigation.

VII. MISCELLANEOUS ACTIVITIES.

Work of the statistical office.—The work of the statistical office has been along four general lines, two of which have been referred to previously; that is, relationship of eye defects and illumination, and heat and humidity studies.

In addition to this work analysis has been begun of the physical examination of 10,140 men and 1,688 women in 10 industries, in which physical measurements, defects, and diseases are studied. The analysis is being made by age, sex, race stock, nutrition, appearance, under and over weight, industry, occupation, length of service, and industrial hazards. It is expected that some standards of physical measurements and rates of defects and impairments will result from a complete analysis of the material.

The results of analysis of physical examinations of 985 men employed in the Post Office Department are as follows:

Following the classification used by the Life Extension Institute, there were found in—

Group 1. Without physical defects	5
Group 2. Minor defects requiring observation or attention	12
Group 3. Moderate defects requiring hygienic correction or minor medical, surgical, or dental attention	258
Group 4. Moderate defects requiring medical supervision as well as hygienic correction	336
Group 5. Advanced physical impairments requiring systemic medical or surgical attention	234
Group 6. Serious physical defects requiring immediate attention	140

Although 140 men were classified in Group 6, these individuals were on full duty at the time of the examination. A few of the most serious physical defects found in this group were 4 cases of nephritis, 35 cases of aortic murmur, 3 cases of tricuspid murmur, 23 of mitral murmur, 3 of positive tuberculosis, 3 of diabetes, 56 overweight and underweight of over 40 pounds for age and height.

Public Health Administration Studies.

North Dakota.—At the request of the governor and State health officer, Surg. Robert Olesen was detailed to assist the State authorities in strengthening the State health department of North Dakota. In March, 1922, a preliminary survey revealed the fact that the State board of health of North Dakota received the smallest annual sum allotted in any State for health work. A complete report of the studies made in North Dakota appeared in the Public Health Reports of December 8, 1922. This report concluded that public health administration in North Dakota was notably deficient. The activities undertaken by the Public Health Service may be classified as

administrative, educational, and investigative. As a result of 10 months' intensive work by the service in North Dakota the following principal accomplishments may be noted:

1. An appropriation two and one-half times larger than the customary annual allotment was allowed by the legislature and provision made for the employment of a full-time State health officer. Inasmuch as the legislature made a total biennial appropriation of $500,000 less than during the preceding biennium, the amount obtained for the State department of health was not altogether discouraging.

2. The headquarters of the State department of health has been permanently transferred to Bismarck, the capital of the State.

3. Provision has been made for a whole-time State health officer.

4. Necessary working divisions have been provided for, even though inadequate appropriations have been made for their maintenance.

5. The people of the State have been aroused to the need for an adequate public health organization.

Knoxville, Tenn.—Upon the request of the State health officer a study of the public health organization of Knoxville, Tenn., was made during the early part of the fiscal year by Surg. Carroll Fox.

The survey included a study of the functions of the city health officer, the provisions for collecting vital statistics and for controlling communicable diseases, the city laboratory, the divisions of food inspection, meat and livestock inspection, milk inspection, the filtration plant, sanitation, health supervision of schools, hospitals, the health center, and an examination of the finances of the health section of the city government.

A number of recommendations were made in regard to the reorganization of the health department of Knoxville, and an estimate of the amount of money required for the proper support of the health work of the city was submitted.

Washington County, Md.—Washington County public health demonstration, with headquarters at Hagerstown, continued during the year under the direction of Passed Asst. Surg. R. B. Norment, jr. The cooperating agencies included in addition to the United States Public Health Service the State Board of Health of Maryland, the International Health Board, the School of Hygiene and Public Health of the Johns Hopkins University, and the Washington County Public Health Association. The cooperation and assistance of the local and State charitable and welfare organizations and hospitals has been of great assistance in the conduct of the work. The demonstration has carried on the following activities: Communicable disease investigations, smallpox vaccinations, diphtheria immunization and Schick testing, sanitary inspections, laboratory service, child hygiene and school hygiene, health education, public health nursing, clinics for diagnosis and treatment, and special studies of morbidity and of dust hazards in the cement industry. During the year, methods in rural health administration were demonstrated to 36 students of the School of Hygiene and Public Health of the Johns Hopkins University and to 27 other visitors.

West Virginia.—In cooperation with the State and local authorities and upon their request, Bacteriologist T. W. Kemmerer made an

inspection of the State laboratory at Charleston and assisted in the establishment of a laboratory at Kingwood. Detailed recommendations were submitted and helpful suggestions furnished in regard to the operation and equipment of these laboratories.

Sanitary Surveys of Coal Mining Camps and Communities.

At the request of and in cooperation with the United States Coal Commission, the Public Health Service made a series of sanitary surveys of coal-mining camps and communities, beginning in March, 1923, under the general supervision of Surg. L. R. Thompson, in charge of the Industrial Hygiene and Sanitation Office, while the field work was done under the direction of Surg. Robert Olesen.

Object and scope.—A number of representative communities were rated in accordance with a plan that had been evolved after a number of years of experience in making sanitary surveys of various industrial towns in different parts of the country. Of the 120 places surveyed, 19 were located in the anthracite coal region of Pennsylvania, thus affording an opportunity of making a comparison with camps located in the bituminous fields. Representative camps and communities were surveyed in 7 States, thereby enabling a comparison of geographical locations as well. The collective ratings and the principal subjects covered were as follows:

	Maximum number of points.
1. Environment and habits of population	3.0
2. Water	40.0
3. Disposal of human excrement	32.0
4. General sanitary control	12.5
5. Disease prevention activities	12.5
Total	100.0

The sanitary ratings varied within wide limits, the highest being 80 and the lowest 10 of a possible 100 points. Generally speaking, the majority of the smaller camps are lacking in many essentials, the standards usually improving as the population increases. One of the facts brought out during the survey was the failure of many supervisors or officials to provide for the maintenance of sanitary fixtures and devices. In reaching a conclusion as to the credit due for environment and habits of the population there were taken into account the nationalities represented, the age of the community, the character of the houses, the presence of trees, grass, and gardens, the opportunities for recreation and amusement, the facilities for reaching other communities, and the general appearance of the people themselves. The nature of the occupation was of course considered. With the advent of the low-priced automobile and other means of quick and convenient transportation, there is a tendency to desert the mining patch and live in near-by cities. This is responsible for considerable improvement in the living conditions of the miners who have migrated to the more favorably located and better administered communities.

The greatest possible diversity exists with regard to the source and safety of the water supplies in mining patches. The principal faults connected with the water system seen in the mining camps

and towns were failure to provide a sufficient supply, objectionable taste of the water, inadequate protection of the supply against surface or subsurface pollution, and absence of convenient means of raising the water. A number of places were visited, however, in which all reasonable requirements, even to the extent of careful chlorination, filtration, and constant laboratory surveillance, are constantly practiced.

The general excreta disposal is in an unsatisfactory condition in three mining camps.

With reference to fly prevalence, it was found that over 90 per cent of the places have no system whereby garbage and refuse may be removed frequently and regularly. The importance of manure as fly-breeding material is practically unrecognized, and no attempts are made to remove manure except for use as fertilizer. Many of the storekeepers leave foodstuffs unprotected. Few homes are effectively screened against flies. Even in the best mining camps little or no attention is given to the control of the milk supply.

Communicable disease control and prophylactic measures are inadequate in the majority of camps. In a small proportion of the places visited either whole-time or part-time health officers or sanitary inspectors have been employed. Almost without exception the employment of such a supervisor has greatly increased the efficiency with which public health affairs are administered.

Cooperation with the Johns Hopkins University—School of Hygiene and Public Health—Epidemiological Study of Diphtheria.

In response to the request of the university authorities, Surg. W. H. Frost has been continued in his assignment to the Johns Hopkins University School of Hygiene and Public Health as professor of epidemiology and head of the Department of Epidemiology and Public Health Administration. In connection with this assignment, he has been in charge of the epidemiological investigations carried on in that department of the university, consisting chiefly of an epidemiological study of diphtheria conducted in cooperation with another department of the university and with the Baltimore City Health Department. Since December, 1922, the service has participated actively in this work by the assignment of Passed Asst. Surg. R. P. Sandidge to assist in the field work.

The study comprises: (1) An epidemiological investigation of all cases of diphtheria reported in an area of about 150,000 population in the city of Baltimore. (2) A study of the practicability and efficiency of toxin-antitoxin immunization in a section of this area with a population of about 30,000. As the result of the first year's work one-third of the children in this area have been Schick tested, and those found susceptible have almost without exception received immunizing injections of toxin-antitoxin. The work is being continued with a special effort during the summer months to reach children of preschool age. The prevalence of diphtheria in this area during the past 12 months has been definitely lowered, and it is believed that this may be attributed to the work done. However, as much of the work this year was done during and after the season of highest prevalence of diphtheria, it is not expected to exhibit its full effect until the ensuing autumn and winter.

Cooperation with Indian Service.

Examinations of specimens and tests of a bacteriological nature to aid in the diagnosis of communicable diseases have been made at the Public Health Service laboratories for physicians of the Indian Service.

Taos and Picuris Pueblos.—In response to a request of the Department of the Interior an investigation was made by Passed Asst. Surg. R. E. Dyer in May, 1923, to determine the prevalence of disease among the Indians of Taos and Picuris Pueblos in northern New Mexico. Records of the causes of death were only available beginning with the year 1911 and are quite incomplete since that time. Out of 169 deaths at Taos recorded in the above period 82 were from unknown causes. The average death rate per thousand population for the period for which records are available was 25.5. For the year 1920 the rate was 32.9 in contrast with that for the registration area for 1920, which was 13.1 per thousand population. The average birth rate per thousand population for the period for which records are available was 32.8. For the year 1920 the rate was 40.1, and for the registration area for 1920 the rate per thousand population was 23.7. There follows a summary of the prevalence of certain diseases determined after examination of 336 of the population at Taos:

Tuberculosis:	
Pulmonary	3
Bone	2
Trachoma	45
Insane	2
Goiter with exophthalmos	1
Diabetes mellitus	1
Syphilis	28
Gonorrhea	1

At Picuris 59 individuals were examined, 28 children and 31 adults; 10 children and 10 adults had trachoma; 7 cases of cataract were seen. No other diseases were noted.

Milk Investigations.

Milk sanitation studies were begun by the Public Health Service in December, 1922, in response to the request of the State department of health of Alabama for advice and cooperation in the matter of formulating milk laws and ordinances and assistance in the formulation of a state-wide milk sanitation program. Associate Sanitary Engineer L. C. Frank was detailed to have charge of the investigations, and headquarters were established at Montgomery, Ala.

The development of milk sanitation has been haphazard, and there is a discouraging lack of uniformity in standards in municipal milk ordinances. What is grade "A" milk in one city is Grade "B" or even grade "C" milk in another city. The first part of the problem attacked was the question of the program to be adopted. After careful study the following program was formulated:

1. To make studies of existing types of milk legislation in order to determine the most desirable type.

2. To make field studies of the present methods of bringing about the enactment of model milk legislation with the minimum amount of antagonism from the dairy interests.

3. To assist State departments of health by encouraging the adoption of model milk legislation.

4. To develop a plan, if possible, for rating or scoring the milk sanitation status of cities for comparative purposes.

5. To make such local surveys and reports on milk sanitation as may be requested by State departments of health or by municipalities through and with the consent of State departments of health.

6. To make studies of the relationship of milk quality to milk-borne disease incidence, particularly the endemic incidence.

7. To make such other researches in problems of milk sanitation as may from time to time appear necessary.

The ordinances of some 50 cities have been studied. It was decided to select the type of ordinance which seemed theoretically to be the most logical and use it as a point of departure. Accordingly the grading type of milk ordinance was selected as being apparently the most logical, and recommended to the Alabama State department of health for adoption as the State model milk ordinance. In February, 1923, the State department of health adopted that ordinance as its model.

The last four months of the year were spent in the attempt to encourage Alabama cities to adopt the ordinance. Thus far the work has begun in Montgomery, Tuscaloosa, Gadsden, and Mobile. Tuscaloosa and Gadsden have passed the ordinance.

It is believed that a sufficient number of Alabama cities will have passed the model grading ordinance by January, 1924, to make the study of enforcement results possible upon a sufficiently large scale to be of value.

The cooperation of the service with a number of representative governmental control agencies and representatives of the milk industry in a study of processes and mechanisms for the pasteurization of milk is referred to on page 59.

Child Hygiene Investigations.

During the fiscal year field investigations in child hygiene have been carried on under the direction of Surg. Taliaferro Clark. These investigations have included studies of child health administration and research in special child health problems.

The extensive studies of the physical development of children begun during the preceding fiscal year were continued with the object of establishing, if possible, a more accurate standard of physical development of children than any now in use. It is quite generally admitted that the existing standards are not entirely free from error. Already these anthropometric studies have been made the subject of special reports, and additional information will be made public from time to time as more material becomes available. Of striking interest is a report based on the analysis of physical data relating to 506 children reported by medical officers of the service as of "good" and "excellent" nutrition status, in good health, and free from hampering physical defects. These children were compared under three indices of nutrition, namely, that of Thomas D. Wood, Georges Dreyer, and Pirquet's so-called "Pelidisi" index. In this group of 506 children, 20 per cent were more than 10 per cent under-

weight by Wood's standard, 13 per cent by Dreyer's, and 17 per cent by the "Pelidisi" index.

In applying these standards separately, a total of 210 children were classified as underweight by one or more of them. All three standards were in agreement on only 15 children of this group. It seems probable that for the children included in this study either existing standards are inaccurate, or else the physical development of children can not be accurately evaluated by standards derived from averages of large groups.

During the year special anthropometric measurements were made in widely separated sections of the country—southeastern Missouri, 1,839; St. Louis, Mo., 3,825; Elgin and Aurora, Ill., 1,133; Utah, 1,946; Nevada, 387; and Hagerstown, Md., 1,438; a total of 10,568 measurements. The compilation of this data is now under way.

CHILD HYGIENE STUDIES IN MALARIA.

In order to show whether there is any correlation between malaria infection and the physical condition and development of the child, this disease was studied from two viewpoints:

(1) The effect of chronic or repeated acute attacks of malaria on the physical development of the school child, and (2) The relative value of blood examinations for the parasite and enlargement of the spleen in school children as an index of malaria prevalence.

Dunklin County, Mo., was selected for this work. This county has a reported mortality from malaria of 10 per 10,000. It is a densely populated rural county, and because of its swampy character, anopheline mosquitoes are plentiful.

During the study 2,437 school children were measured and given general physical examinations. The physical findings on these children will be made the subject of a special report later.

Blood smears from 1,044 children were examined for malaria parasites. Of this number 56 were found positive, or a rate of 5.4 per cent.

One thousand three hundred and fifty-five children were examined for enlarged spleens—80 were found with palpable spleens, or a rate of 5.9 per cent.

Out of the 2,437 children examined, 30.4 per cent gave a history of having had malaria within two years.

In December, 1921, a large group of boys in this county had been similarly examined. The results were history index, 30.8; spleen index, 7.9; and parasite index, 7.3.

A comparative study of the indices obtained by these two surveys is being made the subject of a special report.

A group of 880 children were examined for both blood parasites and enlarged spleens. In this group, 46 children were found with parasites in the blood, a percentage rate of 5.2, and 45 had palpable spleens, a percentage rate of 5.1. It would seem, therefore, that palpation of the spleen is nearly as accurate a method for determining the prevalence of malaria in a community as finding the malaria plasmodia in the blood and the simplicity of the former is much in its favor. Neither method will discover all of the malaria present in a community at a given time.

Of the 880 cases, only 21 were positive for both enlarged spleens and blood parasites; 25 were positive for blood parasites and negative

for enlarged spleens, and 24 were negative for blood parasites and positive for enlarged spleens. Consequently about one-third of the cases would have been missed by either method alone. These rates are probably low, due to the rather general use of quinine, in some form, in this community. Of 313 positive history cases, 94.6 per cent stated that they took quinine, though none in standard treatment quantities.

Contrary to findings elsewhere, this study did not show any significance in the age distribution of enlarged spleens.

INVESTIGATION OF ORAL HYGIENE PROBLEMS OF CHILDHOOD.

Pennsylvania and Rhode Island.—Continuing the policy of cooperating with the State educational authorities in educational work at the summer normal schools during the period when the mouth hygiene unit would otherwise be idle through closure of regular schools, the service unit visited the States of Pennsylvania and Rhode Island during July and August, 1922. A large number of teachers and prospective teachers were given instruction in dental prophylaxis. In addition, lectures and personal conferences were conducted. The work in the normal schools is helpful in bringing more graphically before teachers the importance of dental hygiene to the school children. Incidentally the education of the teacher in this phase of constructive health work has been found an easy method of quickening her interest in the general health of the pupils.

Missouri.—On request of the State board of health, the mouth hygiene unit was detailed to the State of Missouri, September 24, 1922, to cooperate with the State board of health in oral hygiene investigations of school children. This work was discontinued February 19, 1923. A total of 1,884 school children were studied in 33 schools and 11 communities.

Illinois.—On conclusion of the oral hygiene investigations in Missouri, the mouth hygiene unit was detailed to the State of Illinois on invitation of the State department of public health to cooperate with the State health and educational authorities in similar investigations in that State, and remained until the close of the fiscal year. In the course of these investigations 5 communities and 51 schools were visited, the mouths of 871 children were charted, and 40 cases of mouth sepsis were treated with the consent of the parents for demonstration purposes. In addition one State normal school was visited, where 319 teachers and prospective teachers received examinations. Here also a number of clinical cases were treated for educational purposes.

During these investigations both in Missouri and Illinois a large amount of data was accumulated for use in studying the effect of diseased mouths on the physical development and school progress of affected children. The results of these studies, when completed, will be made the subject of a special report.

CHILD HYGIENE IN HAGERSTOWN, MD.

The child hygiene investigations begun last year were continued at Hagerstown, Md., and in Washington County in connection with the Washington County health demonstration which is being conducted on a cooperative basis. The cooperating agencies are the

Maryland State board of health, the United States Public Health Service, the International Health Board, the Johns Hopkins University School of Hygiene and Public Health, and the Washington County Public Health Association. The program followed was a continuation and elaboration of that begun the previous year. Due to the nature of the investigations, none of the studies was entirely completed during the year; hence it is not possible to give here definite results of the findings.

The scope of the Hagerstown studies may be briefly stated as follows:

(*a*) A study of the physical development of children with special reference to annual increments of height and weight.

(*b*) A study of absenteeism from school and the causative factors.

(*c*) A study of nutritional problems of preschool and school children.

(*d*) The collection of anthropometric data on school children.

(*e*) Studies of health problems in education.

(*f*) Investigations in the age-grade status of school children.

During the course of the school year, 2,951 school children were given complete physical examinations, 1,315 of whom were children who were weighed and measured last year.

Special measures were employed, including personal conferences with parents, home notification, and health instruction of the child in school, to secure the necessary correction of hampering physical defects observed in these children.

Absenteeism from school was studied in a group of approximately 6,000 children in all grades in the Hagerstown schools. This study will be made the subject of a special report.

Anthropometric observations were made of 1,438 children, ranging in age from 6 to 14 years.

Incidental to special studies on nutrition, a total of 10,518 children were reached in educational nutrition work, many only once by classroom lectures, and others a great many times through more intensive classes in nutrition. An effort was made to teach all the children through lectures and by practical methods the fundamental principles of nutrition. In addition, special classes were held for selected malnourished children.

A pamphlet entitled "Health lessons for nutrition classes" was prepared, which was published by the local women's club for free distribution to teachers and other interested individuals.

Studies in the natural illumination of classrooms were undertaken near the close of the school year. This work is to be elaborated and continued during the coming year.

CHILD HYGIENE IN ELGIN AND AURORA, ILL.

On request of the local educational authorities, with the indorsement of the State department of public health, service officers were detailed to the cities of Elgin and Aurora, Ill., in February, 1923, for the purpose of studying health work in the schools. This work was continued until the closing of the schools for the summer vacation in June. With the cooperation of the local school nursing staff, 1,453 children were given a complete physical examination, in connection with which the methods of using health scoring were

stressed. The essence of this system is teaching health by the visual method and stimulating the interest of the child in his physical condition. The results of this system appear to be much more effective than could be obtained by the methods usually employed.

Special anthropometric data were obtained in the case of 1,133 children for use in connection with the attempt of the Public Health Service to arrive at a more satisfactory standard of the physical development of children.

The mouth hygiene unit also visited Elgin for a brief period, during which special data relating to the oral conditions among the children were obtained. Local interest remained excellent throughout these investigations and a good beginning was made toward having the essential defects corrected. However, this will necessarily extend into the summer vacation and the amount of corrective work done as a result of these investigations can not be determined until the opening of the schools next fall.

CHILD HYGIENE IN MISSOURI.

The child hygiene activities in the State of Missouri, which had been carried on during the two previous years in cooperation with the State board of health, were limited during this fiscal year to the services of one medical officer, and were discontinued at the end of the fiscal year. The investigations were confined to studies in local communities for the purpose of showing the need and value of child and infant health work. With the assistance of one, and occasionally two, State nurses, 96 communities were visited and 5,848 school children were given physical examinations. Baby clinics were also held at different parts of the State, at which 952 babies were examined and weighed. When desired, individual conferences with mothers were held in connection with these baby clinics.

The tangible results of this work to the community are largely educational. In some instances the interest aroused resulted in the employment of full-time public health nurses, and, more gradually, in establishing full-time county health organizations. Moreover, the work of this officer in the field emphasized the undue prevalence of trachoma in certain sections of the State. Public attention had already been focused on trachoma as a special public health problem by studies made during previous years, with the result that a special hospital was opened at Rollo, Mo., on July 24, 1923, for the care and treatment of trachoma.

CHILD HYGIENE IN UTAH.

The studies in child hygiene undertaken during the previous year in the State of Utah were continued more energetically during the fiscal year 1923. These studies were carried on in cooperation with the State and local authorities and other health agencies, and completed in March, 1923.

The plan of work was a continuation of the program adopted during the previous year by the cooperating agencies, the State board of health, the Utah Public Health Association, and the United States Public Health Service. The program included studies and investigations relating to the health of infants and children of preschool age;

infant welfare work through local health centers; educational features by means of lectures, motion pictures, news items to the press, and exhibits at the State fair; school hygiene and the physical examination of school children: and, incidental to the child hygiene investigations, the prevalence of tuberculosis.

Twenty-three different communities were visited where at least one infant and preschool clinic was held. Without notable exception, the clinics were well attended. In many instances the numbers coming for examination were in excess of available accommodations. Altogether 628 infants and 641 preschool children were given physical examinations. Of these 328 infants, 76.2 per cent were entirely breast fed, 11.8 per cent. partially breast fed and 12 per cent entirely artificially fed. The physical findings did not reveal any unusual prevalence of defects. Of the 641 preschool children, 71.4 per cent were in excellent or good nutrition.

Registration of births seems to be very effective in Utah, if this group of 1,269 infants and preschool children is a good index. Of this group 99.85 per cent, or all but 2 children, were registered.

During the months of July and August a special study in public health nursing was made in the town of Provo. As a direct result, a public health nurse was employed, a health center and clinic was equipped, and a staff of local physicians volunteered their services. Beginning early in January, a study of the school hygiene problems and the establishment of definite preschool work was also undertaken. This was begun at the urgent request of the superintendent of schools. The local authorities supplied two nurses and a home demonstration agent to assist the service's personnel. The study, aside from the publicity and educational features, included the examination of 1,166 high school pupils, 251 children in the first grade, and 116 preschool children. The first grade and preschool children were examined in the presence of the mother, so that opportunity was afforded for personal conferences. Of the high school groups 68 per cent had never been vaccinated, while in the first grade group 90 per cent showed no vaccination against smallpox. During the time of this survey in Provo an epidemic of very virulent smallpox existed in Salt Lake City. As a result local interest was aroused. At the request of the city physician and the superintendent of schools, 800 school children were successfully vaccinated by the service officer.

A town in the goiter section of the State was selected for survey in order to get some idea of the prevalence of this disease. Of 560 children inspected, 128 girls and 40 boys had enlargements ranging up to the very large so-called "big neck." This is a 30 per cent prevalence among school children. In the town of Provo 20 per cent of 1,166 children had thyroid enlargement, while of 2,040 children of school age examined elsewhere in the State less than 2 per cent had enlarged thyroids.

The tuberculosis investigations were continued as in the previous year. Visits were made to 22 communities, at which 990 individuals were given careful chest examinations. Of this number, 7.9 per cent had active pulmonary infection and 13.2 per cent were quiescent cases. The percentage distribution by the counties ranged from 9.6 per cent to 30 per cent. These figures are not indicative of the actual prevalence of pulmonary tuberculosis, since they represent selected cases.

It is interesting to note, however, that in 403 consecutive cases, 65.5 per cent were born in the State of Utah, 18.3 per cent had lived there for over 10 years, and only 1.4 per cent were non resident.

CHILD HYGIENE IN NEVADA.

Following the discontinuance of the Utah investigations the entire Public Health Service personnel in that State were detailed to Nevada, on request of the governor and the State board of health, for the purpose of cooperating with the State health authorities and the Nevada Public Health Association in carrying on similar investigations in that State. In order to facilitate these investigations, the service officer in charge was appointed a deputy State health officer and made medical director of the child welfare division of the State board of health, to serve without compensation.

These investigations are being conducted with the general view of (*a*) maintaining effective school health supervision, consisting of physical examination of children, making special anthropometric measurements, establishing advisory clinics relating to the correction of defects, and attendant follow-up work by the community nurse; (*b*) holding advisory clinics for expectant mothers, infants and preschool children, and establishing a permanent center at a strategic point in each county for the benefit of the county; and (*c*) planning nutrition clinics to be held in conjunction with school and preschool work with the assistance of the university extension department.

Field work was begun as rapidly as arrangements could be formulated. Up until the close of the fiscal year 329 preschool children had been examined and 747 school children. During this time 7 communities were visited.

In general, the sanitary conditions found were very primitive and poor, and conditions around the schools were equally bad. Except in one community, no evidence of preventive treatment among the children was noted.

No conclusion may be drawn from the studies in Nevada at present, since this investigation is not completed.

CHILD HYGIENE IN TEXAS.

On request of the State health officer, a service officer was detailed to the State of Texas in July, 1922, to study the child hygiene administration and to cooperate with the State board of health in field investigations in child hygiene.

Owing to an unforeseen exigency, these investigations were discontinued at the end of seven months. However, it is felt that the interest aroused by the work of the Public Health Service in this State contributed in no small measure to the acceptance by the State of the provisions of the Federal act "to promote the welfare and hygiene of maternity and infancy." Furthermore, the recommendations based on the studies in child health administration in the State were of great value and assistance to the State health officer in outlining the State plan for child health supervision.

In addition to studies of administrative work, the service officer carried on a number of investigations in the field. Infants and

children to the number of 1,948 were weighed, measured, and given a careful physical examination, and a large amount of interesting data was assembled. The physical condition of these children did not markedly deviate from the average found in other communities.

The "junior health department" plan for health education and the Public Health Service's system of health scoring were introduced into a number of schools in the State. These measures excited lively interest in health among the pupils.

Largely as a result of the special investigations in the field, four counties were stimulated to make application to the State authorities for assistance in organizing full-time county health units.

Mental Hygiene.

During the past fiscal year studies of mental hygiene have been conducted by the Public Health Service under the direction of Surg. W. L. Treadway, who was assigned to this duty October 1, 1922. Through the courtesy of Prof. M. J. Rosenau, of the department of preventive medicine and hygiene, Harvard University Medical School, office space was provided at Harvard.

The demand for scientific information regarding means for the controlling and lessening of mental disease is urgent. In 1880 there were 40,942 persons in the United States under care in public institutions because of mental disease; in 1920 the number had increased to 232,680. The rate increase was from 81.6 per 100,000 in 1880 to 220 per 100,000 in 1920, thus almost six times as many people were under care in public institutions in 1920 and the rate per 100,000 of the population had nearly trebled.

In approaching a program for studies in mental health, the service has confined itself during the fiscal year to those activities which have a bearing upon the problem of mental health conservation. A study of foreign immigration seemed to offer the most desirable method of approach, and a large amount of scattered material has been assembled for publication dealing with the subject of mental health and immigration. This manuscript embraces an interpretation of the concept of mental hygiene and a study of the migrations of people with reference to asocial behavior and mental disease. It also embraces certain preliminary observations on the relationship of types of mental disease to racial stocks and the relative frequency of such disorders among foreign born, native born of foreign parentage, and native born of native parentage living in the United States. The preparation of this publication included a study of the evolution of immigration laws, an historical résumé of 100 years of immigration to the United States, observations on the medico-legal aspects of mentally disordered immigrants, and recommendations respecting methods for the better exclusion of mentally disordered persons as well as those who are potentially so inclined.

In addition to the above, certain field studies were inaugurated with respect to the problem of asocial behavior and mental disease in foreign-born persons and native-born persons of foreign parentage. The latter studies embrace a social inquiry into the relationship of these problems to mental health.

Observations made upon ethnic groups living in the United States are sufficiently important to deserve mention and are as follows:

1. Senile and cerebral arterial changes productive of mental diseases are more prone to develop in Teutonic and Celtic stocks. Mixed stock in America also ranks high in this respect.

2. Syphilitic brain disease occurs in a higher ratio among the Indo-Eranic, Sinitic, Negritic, Lettic, Finnic, and Chaldaic stocks, whereas the same disease occurs in a lower ratio among the Anglo-American stock.

3. The Malayic stock is prone to develop mental diseases incident to traumatism.

4. The Celtic are more prone to develop intoxication psychoses than any other stock. The Irish rank first in disorders due to alcohol, while the Slavonic stock is also high in this respect. The Hellenic, Indo-Eranic, and Chaldaic show the lowest ratio of intoxication disorders.

5. Those malignant mental disorders that are associated with faulty mental adjustment occur much more frequently among those peoples comprising the "new immigration." The Tartaric and Hellenic stocks rank highest for this class of disease.

6. Benign mental diseases occur more frequently among Malayic stocks, Anglo-American, Chaldaic, and Sinitic, in the order named. They occur less frequently in the Tartaric, Indo-Eranic, and Celtic stocks.

7. The Anglo-American, Tartaric, and American Indian rank highest for those disorders due to abnormal personal make-up. The Sinitic and Malayic are low.

8. The greatest difficulties are encountered in classifying mental diseases among those peoples in American institutions who are least able to speak the English language.

Statistical Office.

The statistical office, which has been under the direction of Statistician Edgar Sydenstricker since its establishment in 1920, was continued under his direction until February, 1923, when he was granted leave for one year to organize and direct the epidemiological intelligence service of the health section of the League of Nations at Geneva, Switzerland. During the absence of Mr. Sydenstricker, Surg. W. H. Frost has been assigned in general charge of the office, with Asst. Statistician S. D. Collins acting as chief statistician in immediate charge, in addition to his duties as statistician for field investigations of child hygiene. As to other personnel no material changes have been made.

The consultants in vital statistics, Profs. Raymond Pearl and Lowell J. Reed, of the Johns Hopkins University School of Hygiene and Public Health, and Dr. W. I. King, of the National Bureau of Economic Research, New York City, have kept in close touch with the work of the office and have given valuable assistance in the way of suggestions and criticisms. Acknowledgment is also made of the many courtesies and cordial cooperation received from the Census Bureau.

The work of the office, which has followed along the lines laid down when the office was established in 1920 (Annual Report, 1920,

p. 64), falls into two main subdivisions, namely, (1) Investigations conducted independently by the statistical office, and (2) Work in cooperation with other research and administrative units of the service, comprising technical advice in statistical procedures, and providing the necessary mechanical equipment and clerical staff for tabulation of their data.

I. WORK OF THE STATISTICAL OFFICE PROPER.

Studies of morbidity in industrial workers.—This study, begun in 1920, has been continued under the immediate direction of Statistical Expert D. K. Brundage, of the statistical office staff, with clerical assistance from the office of industrial hygiene. Its scope has been constantly extended by enlisting the cooperation each year of a larger number of reporting agencies. It now consists of several distinct though closely related studies, based upon morbidity records furnished by industrial establishments, sick-benefit associations, and Government bureaus, namely:

(1) A study of morbidity based upon the records of sick-benefit associations which take account only of disabling illness of one week or greater duration. Twenty-seven such associations with a membership of 105,000 are now submitting regular reports, from which current monthly tabulations are prepared and distributed to the reporting agencies, thus bringing to their attention any unusually high morbidity rates in order that steps may be taken to correct conditions seemingly responsible. In addition, more detailed analyses of the records are made annually. The results of this study for the year 1921 have been published in an article by Mr. Brundage, "Incidence of serious morbidity among a group of wage earners," in the Public Health Reports, December 29, 1922. An analysis of the 1922 reports will be published shortly.

(2) Four Government bureaus and 14 large industrial establishments, with a total of more than 40,000 employees, are now submitting regular reports of all disabilities of one whole working day or more, thus including a number of minor ailments, notably colds, tonsillitis, "headache," etc., which appear very little in the records of sick-benefit associations. In time the experience of these groups may be expected to establish a reasonably reliable index of "normal" morbidity for comparison with the experience of individual industrial groups.

(3) Records of sickness with a minimum duration of one day which permit of analysis according to sex, age, nationality, marital status, season, occupation, etc., are being tabulated for the purpose of measuring the influence of these factors upon the sickness rate. One company employing 7,000 persons has turned over to the statistical office for tabulation all of its detailed sickness records covering the years 1921 and 1922, the records having been previously transferred to punch cards for mechanical tabulation in accordance with suggestions from this office. The records of other companies will be tabulated similarly, and the statistics published from time to time.

(4) Special studies of the morbidity records of certain sick-benefit associations are being made from different points of view. The records of the Employees' Benefit Association of the International Harvester Co. from 1911 to 1920 are being analyzed to ascertain

what changes have taken place in disease incidence in a 10-year period; the chronology of cases among persons experiencing an excessive amount of disability; the seasonal variation in sickness incidence; the age-distribution of persons ill from certain degenerative diseases; and the relation of morbidity to sex, age, and nationality. The frequency and severity of illness lasting six days or longer occurring in 1921 and 1922 among 21,000 employees in the automobile factories of Flint and Pontiac, Michigan, are also being studied.

Study of total morbidity in the general population.—In November, 1921, a field party from the statistical office was assigned to an intensive study of morbidity in Hagerstown, Md., this locality being selected because of the exceptional facilities afforded in connection with the work of the Washington County health unit. Some 2,200 families, comprising about 9,000 individuals, selected in such manner as to constitute a fair sample of the total population, were canvassed first to secure records of color, sex, and age distribution, together with important details of economic status and sanitary environment. Each of these families was revisited at intervals of about two months throughout the calendar year 1922, careful record being made of all illness reported by the householder, with as full detail as possible regarding causes, duration, and medical attention. Diagnoses in cases with medical attention have been referred to the attending physicians for verification or revision. The records of the first year's study are now in process of compilation at the statistical office.

In order to give a sufficient experience, the field survey is being continued to cover the calendar year 1923, with some changes in its scope and organization. Since January, 1923, it has been placed under the immediate direction of Acting Asst. Surg. A. S. Gray, stationed at Hagerstown, in connection with studies of industrial hygiene; and in order to reduce the interval between visits, thus adding to the reliability of the records, the number of families included in the study has been reduced to about 1,500.

The two years' study, when completed, will furnish a unique record of the frequency, duration, and causes of illness of all kinds in a group which is fairly representative of the general population of the country, a record which is not at present available. Its usefulness as an index of the relative public health importance of various classes of disease and as a basis for comparison with industrial morbidity records is obvious.

Statistical studies of morbidity from pulmonary tuberculosis.—A detailed and critical analysis of statistics of mortality from pulmonary tuberculosis, begun in 1922 by Mr. Sydenstricker, has been continued along lines indicated in the annual report for 1922 (p. 214). The questions to which special study has been directed are: The trend of mortality in recent years; its relation to the influenza epidemic of 1918–19; the age distribution of deaths in the two sexes in each registration State; the changes in age distribution in successive decades; and the correlations of death rates from tuberculosis with those from other causes.

A study of the trend of mortality in recent years (Pulmonary tuberculosis mortality in recent years, P. H. R., vol. 37, No. 46, Nov. 17, 1922) was published during the past year. This study shows that there was a distinct increase in mortality from pulmonary

tuberculosis in the United States during the year 1915, closely associated with the increased mortality from influenza during that period, followed by a sharp decline in 1920 and 1921.

The data required for significant reports upon other phases of tuberculosis mortality have been in large part assembled, and further reports will be issued from time to time.

Statistical studies of mortality from influenza and pneumonia.—In connection with the statistical and epidemiological studies of influenza begun by the service during the epidemic of 1918–19, the results of which have been published in a series of articles, the statistical office has continued up to the present time to collect data upon the mortality from influenza and pneumonia during the periods preceding and following that pandemic, undertaking to assemble comparable records of mortality in a number of foreign countries covering as nearly as possible the period from 1890 to the present. These data, which can be assembled only gradually as more urgent work permits, are being analyzed with a view to throwing more light upon the epidemiology of influenza during the intervals between recognized pandemics. The study has been under the immediate direction of Junior Statistician R. H. Britten.

Studies in statistical technique.—The problems under investigation in the statistical office are often of a character requiring rather extensive studies of the statistical technique applicable to them. Special attention has, therefore, necessarily been given to the development of satisfactory methods for indicating the general trend of morbidity or mortality over long periods and for bringing out clearly the extreme fluctuations which may be considered as due to specific influences rather than to the indeterminate complex of influences called "chance." A paper dealing with this general problem has recently been submitted to the bureau for publication.

Courses in vital statistics for commissioned officers.—During the past year two courses in the elements of statistical theory and practice as applied to vital statistics have been given by the staff of the statistical office to medical officers assigned to the Hygienic Laboratory for instruction. The courses have consisted chiefly of supervised work on assigned statistical problems; and, though they have necessarily been short, they have proved sufficient to give a working knowledge of elementary principles and methods.

II. WORK IN COOPERATION WITH OTHER ORGANIZATIONS OF THE SERVICE.

In accordance with the purposes in view when the statistical office was established, a large part of its work consists not in conducting independent investigations but in rendering assistance to other units of the service, in carrying out statistical phases of work for which they are responsible. This cooperation comprises:

(1) Technical advice and criticism in matters of statistical procedure, including the preparation of record forms, punch cards, and tabulation forms, and in some instances collaboration in the preparation of reports for publication.

(2) The assignment of statistical personnel to undertake or to assist in statistical analyses incident to the work of other units.

(3) The use of the mechanical equipment and operatives of the statistical office for tabulations or computations involving the use of mechanical appliances, the statistical office assuming responsibility merely for making the tabulations and computations required, not for the ultimate analyses or interpretation of the results.

The units of the service to which the statistical office has rendered more or less extensive service during the past year include: Field investigations of child hygiene, industrial hygiene, pellagra, and cancer; also the statistical units of the divisions of marine hospitals and relief, sanitary reports and statistics, and venereal diseases. The work done in connection with these independent activities is, both in volume and in importance, the major work of the statistical office.

Child hygiene.—In connection with field investigations of child hygiene the statistical office has provided the mechanical equipment and supplemented the clerical staff needed for the tabulation of extensive statistical records collected by the field organization; and the statistician in charge of the office has collaborated in the preparation of two statistical reports dealing with the heights and weights of children as indices of nutrition. Since the detachment of Mr. Sydenstricker the statistical office has been under the immediate direction of Mr. Collins, who also remains in charge of the statistical work in child hygiene, thus virtually merging the statistical work of the two offices.

Industrial hygiene.—The work of the statistical office in connection with the office of industrial hygiene has consisted chiefly in providing facilities for mechanical tabulations, and in the joint conduct of studies in industrial morbidity, previously described. In addition, close personal contact has been maintained between the statistician in charge of the statistical office and the officers responsible for the statistical work in industrial hygiene.

Cancer research.—At the request of Surg. J. W. Schereschewsky, in charge of cancer research, detailed statistics of mortality from cancer in the States of Massachusetts and New York for the years 1905–1920 have been assembled and partially analyzed for his use.

Hospital division.—During the early portion of the fiscal year the statistical unit of the Division of Marine Hospitals and Relief was under the immediate supervision of the statistical office; and considerable time was devoted to revising the records, coding instructions and methods of tabulation in use. Since completion of this work the statistical office has occupied a merely advisory relation to this unit.

Venereal diseases.—The statistics collected by the Division of Venereal Diseases from cooperating clinics have been compiled in the statistical office by personnel detailed from the Division of Venereal Diseases, working under the general supervision of the statistical office.

Miscellaneous.—More or less extensive service in compiling statistics or in technical advice has been rendered in connection with a number of other service activities, including studies of pellagra, studies of the epidemiology of minor respiratory diseases, statistical studies of mental defects in aliens, and reviews of a number of scientific reports referred by the Surgeon General for criticism of statistical presentations.

Investigations of Stream Pollution.

Studies of stream pollution and of allied problems relating to the natural purification of streams and to the artificial treatment of water and sewage have been continued in pursuance of the same general plans that have governed the work in past years. The work has remained under the general direction of Surg. W. H. Frost, stationed at Baltimore, Md. The field activities, centered at the stream pollution laboratory, Cincinnati, Ohio, were under the immediate direction of Sanitary Engineer R. E. Tarbett until his detachment in December, 1922, for assignment to other duty, when he was succeeded by Sanitary Engineer J. K. Hoskins.

In planning and carrying out the work of this organization, substantial and valuable assistance has been rendered by the consultants in stream pollution appointed during the previous fiscal year, namely, Dr. Stephen A. Forbes, of the University of Illinois; Dr. E. O. Jordan, of the University of Chicago; and Mr. Langdon Pearse, sanitary engineer of the Chicago Sanitary District; also by the two additional consultants appointed during the past year, Mr. Earle B. Phelps, consulting sanitary engineer, of New York City, and Mr. Jospeh W. Ellms, consulting Sanitary Engineer, of Cleveland, Ohio. In addition to meeting at Cincinnati on December 11, 1922, for a review and inspection of the work in progress and for a conference relative to its continuance and extension, these consultants have rendered great service in giving advice upon technical questions referred to them individually from time to time.

Illinois River investigation.—Field work upon a study of the pollution and natural purification of the Illinois River, which had been in progress under the direction of Sanitary Engineer J. K. Hoskins since April, 1921, as outlined in the annual reports for 1921 and 1922, was brought to a close as planned on September 15, 1922. The permanent personnel assigned to that work was then transferred to Cincinnati to compile and analyze the data collected, and for assignment to other work.

At the close of the fiscal year the analysis of these data, an undertaking involving approximately as much labor as the field work, is still incomplete, though progress has been satisfactory and has kept pace with the estimates of time required for completion of the various sections. In order to facilitate and expedite presentation, the results are being prepared for publication in a series of reports, the first of which will comprise basic data and what are considered the most important analyses, to be followed as promptly as possible by supplementary reports dealing in more detail with special phases of the studies. The first of these reports is now nearing completion.

The significance of the observations made in the study of the Illinois River can not be fully and precisely appraised until analysis of all the data shall have been completed. Enough has already been learned, however, to justify the conclusion that, at least as regards bacterial pollution, the purification observed in the Illinois River follows determinable laws which can be reduced to fairly exact quantitative terms, and which conform very closely to those observed in the Ohio River. It, therefore, seems likely that in the not very distant future it may be possible to formulate some laws which may

be applied to streams in general for estimating the important, but hitherto unmeasured, effect of natural agencies of purification in reducing excessive bacterial pollution.

Experimental studies of bacterial death rates in water.—In view of the great difficulties and expense of making adequate observations upon the rates of bacterial decrease in flowing streams, it is obviously desirable to devise methods which will permit the same processes to be studied experimentally on the small scale adapted to a laboratory; and from time to time during several years observations have been made at the Cincinnati laboratory upon the death rates of bacteria in river water and sewage stored in small containers which have been kept under varying conditions. Up to this time, however, no success has been achieved in reproducing, in small containers, the changes which are known to take place in nature in large bodies of water.

In order to make a more systematic study of the conditions requisite for placing the study of natural purification in river waters upon a satisfactory experimental basis, a branch laboratory was established in May, 1922, at Fernbank, on the Ohio River, immediately below the city of Cincinnati, space for this laboratory being furnished by the district engineer in one of the buildings on the Government reservation at Ohio River Dam No. 37. At this laboratory a series of experiments is being carried out by a technical assistant under the immediate direction of Asst. Bacteriologist C. T. Butterfield. The results so far obtained have been largely negative and have not established a basis for satisfactory study on an experimental scale, although they have served to indicate somewhat more clearly the direction which further experiments should take. It is proposed to continue this experiment station in operation during the remainder of the summer and autumn, by which time it is hoped that some definite progress will have been made toward developing methods of experimental investigation which can profitably be pursued in the Cincinnati laboratory.

Collective and experimental studies of water purification.—In accordance with the advice of consultants in stream pollution and with that of a number of State sanitary engineers whose opinions have been sought, Sanitary Engineer H. W. Streeter was assigned during the latter part of the fiscal year to a systematic and critical study of the processes of water purification as at present practiced. The study, which is planned to continue through the next fiscal year, aims to determine more precisely the efficiency and costs of water purification in the presence of bacterial pollution approaching or exceeding what are now considered to be the limits of permissible pollution of raw waters. The importance of such study is obvious in relation to any general policy of controlling the pollution of streams used as sources of municipal water supplies.

The study comprises: (1) Collection from about 20 selected municipal filtration plants of detailed records of operation, as well as of bacteriological and chemical examinations of the water, raw and in each stage of purification. The plants included in this study have been selected with a view to their geographic distribution, structure, operation, and availability of uniform and reliable laboratory reports. (2) An experimental study, utilizing a small-scale experimental filter plant on the grounds of the Cincinnati laboratory. This plant will

be so constructed and connected to various sources of supply that the chemical and physical characteristics and bacterial pollution of the raw water can be varied at will within a very wide range. This plant is now under construction and should be in operation by October, 1923.

Studies of the physical chemistry of coagulation in water purification.—During the preceding fiscal year Asst. Chemist E. J. Theriault, attached to the Cincinnati laboratory, was temporarily assigned to work at the Hygienic Laboratory, under the direction of Prof. William Mansfield Clark, on a study of the relation of hydrogen-ion concentration and other factors to the "coagulation" of water in the process of purification. Since the return of Mr. Theriault to his station in Cincinnati the work has been continued at the Hygienic Laboratory by Asst. Chemist L. B. Miller, similarly detailed to work under the direction of Professor Clark. A first report upon these studies has recently been published entitled "An experimental study of the relation of hydrogen ion concentrations to the formation of floc in alum solutions." Public Health Reports, vol. 38, No. 5, Feb. 2, 1923.

Other activities at Cincinnati laboratory.—Special Expert (Biologist) W. C. Purdy, with the aid of a technical assistant, has been engaged in the microscopic examination of specimens of water and bottom sediment collected from the Illinois River during the period from April, 1920, to September, 1922. This examination, which includes the enumeration, identification, and classification of plankton forms, will require several months in the next fiscal year for its completion.

Asst. Chemist E. J. Theriault, in addition to compiling and analyzing the results of chemical examinations made in connection with the study of the Illinois River, has been engaged in preparing a series of reports upon the technique, precision, and consistency of determinations of the biological oxygen demand of water and sewage. Material for these studies has been assembled from the determinations made in the study of the Illinois River and in previous studies of sewage and industrial wastes. Studies have been undertaken with a view to establishing the biological oxygen demand determination upon a much firmer basis of reliability than has heretofore been established.

In the spring of 1923 the officer in charge of these activities was directed to participate in a conference held at the bureau at the instance of certain State health officers, to discuss a relatively new and apparently serious development regarding stream pollution. This problem arises from the recent and rapid development of industries which discharge into the streams certain phenol-like wastes, which appear from the evidence submitted at the conference to have possibilities of grave sanitary consequences. The service was requested to approach certain phases of the problem and plans are being made to that end.

Excreta-Disposal Studies.

The board appointed to study the problems of sanitary disposal of human excreta in unsewered communities has continued field studies at Fort Caswell, N. C., and Wilmington, N. C.; administrative work and a review of the world's literature on the subject were continued in the division of zoology, Hygienic Laboratory, Washington, D. C.

GROUND-WATER POLLUTION.

In connection with this general subject, it is to be recalled that the pollution of the ground water by privy wastes, and the possibility and method of extension of this pollution to wells, springs, and other water supplies, have been subjects of discussion, experiment, and public health legislation for many years and in various parts of the world; but the opinions which sanitarians have held on this general subject have been far from uniform, the results of experiments have been largely negative, and legislative policies have been distinctly contradictory.

Extensive and rigorously controlled experiments have been made during the year in continuation of the studies previously reported, which bear especially upon the movement of bacteria of fecal origin in the ground water. These studies have involved the experimental pollution of the ground water, have been correlated with the rise and fall of the ground-water table, the flow of ground water, and the rainfall. Human excreta from can-type privies was used as pollution material, *Bacillus coli* was taken as the bacterial test, and a dye (uranin) was utilized in tracing the movement of the water from the dosing trenches to more than 400 experimental pipe wells which were arranged at intervals from the trenches and at various depths into the ground water. The examination of thousands of water samples from the wells during a period of more than a year has resulted in very definite data which seem to express practically a natural law as applied to the movement of the bacteria in the field of fine sand in which the experiments were conducted. The results to date may be summarized as follows:

1. Pollution with fecal *Bacillus coli* has up to date been definitely and progressively followed in the ground water for distances of 3, 6, 10, 15, 25, 35, 45, 50, 60, and 65 feet from the trench in which the pollution was placed; uranin has been recovered from these same wells and has spread to other wells at 70, 75, 80, 85, 90, 95, 100, 110, and 115 feet from the pollution trench. The soil in question is a fine sand with an effective size of 0.13 mm.

2. The pollution has traveled these distances within a period of 187 days, or about 27 weeks, and only in the direction of the flow of the ground water; no convincing evidence is present that the pollution has traveled against the flow of the ground water or at right angles to it.

3. The pollution has traveled only in a thin sheet at the surface of the zone of saturation; there is no evidence at present that it has dispersed radially downward, and even when heavy pollution is recovered at the top, water from lower levels in near-by deeper wells is negative both for uranin and for *Bacillus coli*.

4. As the ground-water level falls, owing to dry weather, the pollution tends to remain in the sand above the lower ground-water level, in the new capillary fringe.

5. All present evidence is to the effect that when the ground-water level falls the pollution remains practically stranded in the capillary fringe or in the intermediate belt, according to the degree of fall of the ground water.

6. A rainfall of 1 inch results in a rise of 5 to 6 inches in the ground-water table in the particular experimental area in question;

and if this rise is sufficient to reestablish the zone of saturation up at the level of the stranded pollution, the bacteria and the uranin are again picked up and carried along farther in the direction of the ground-water flow until dry weather again intervenes to cause another fall of the ground-water level.

7. The ultimate distance to which the pollution will be carried is dependent upon a number of complex and interlocking factors, namely, wet and dry weather, with resulting rise and fall of the ground water; the length of each of these periods; the rate of the ground-water flow; and also the factor of the viability of the organisms under various conditions of moisture, pH, food supply, etc.

8. In protecting wells, special attention should be given not only to surface protection as is now generally recognized, but also to a new element, namely, the danger zone which exists from the highest water level to about a foot below the lowest water level. A leak in the pipe in this region is potentially very dangerous, and all wells unprotected in this danger zone are to be considered as potentially unsafe.

The bearing of the foregoing results upon the intermittent pollution of wells, the location of water supplies, and the location of camps in peace or war, will be evident to persons who are called upon for technical advice in these matters.

Bacterial tests made during the year of excreta from the 17 sawdust pits in which quantities of human excreta were buried at Wilmington, N. C., in 1920 showed that *Bacillus coli* was still alive.

In an examination of material from 5 of these pits in May, 1923, three years and two months after burial, all were both macroscopically and microscopically recognizable as feces. Three of these samples were positive and two were negative for *Bacillus coli;* ova of *Ascaris lumbricoides* were recognizable in all five samples, but all 57 ova found were dead.

Leprosy Investigation Station, Honolulu, Hawaii.

During the fiscal year 1923 the activities of the leprosy investigation station at Honolulu, Hawaii, have been under the immediate direction of Surg. H. E. Hasseltine. The transfer of the buildings and land constituting the United States leprosy investigation station at Kalawao, Molokai, having been authorized by act of Congress approved September 21, 1922, custody of this property was relinquished on December 1, 1922.

Kalihi Hospital, which is maintained and administered by the Territorial Board of Health, has furnished the clinical material for the work of the station. The Public Health Service furnishes medical attendance and a part of the drugs used in the hospital.

At the end of the fiscal year there were 145 patients in the hospital, though at one time during the year the number was 243. Near the end of the year 92 patients were transferred to the leper settlement at Kalaupapa, Molokai. This was the first transfer since 1919, and was made necessary by the gradual accumulation of advanced and long-standing cases which yielded to treatment very slowly. About 10 per cent of those transferred, though showing slight improvement at times, were evidently worse than when admitted.

During the year 89 patients were admitted and 52 were paroled. There have been 7 deaths during the year, of which 5 have been due to tuberculosis coexisting with leprosy. Several of the patients paroled in 1922 have also died of tuberculosis and in most of them the course of the disease has been rapidly fatal.

All patients, except those suffering from advanced disease other than leprosy, were treated with derivatives of chaulmoogra oil, injected intramuscularly. Most of them received the mixed ethyl esters of the fatty acids of chaulmoogra oil. A group of 10 received the mixed butyl esters, and a group of 6 received the single ethyl ester of dihydro-chaulmoogric acid.

The use of the butyl esters was begun in November, 1922, in the hope that a more rapid improvement would be obtained, or that less local reaction would be encountered, but these hopes have not been realized.

The ester of dihydro-chaulmoogric acid treatment was begun in September, 1921, on 10 patients. Of this number, 2 have improved sufficiently to be paroled, 2 are much improved and their prospects of parole are good, 2 have improved slowly, 2 have remained stationary; and 2 grew worse and were placed upon the mixed ethyl esters.

The patients that received the mixed ethyl esters constitute two large groups, one receiving the mixed ethyl esters with 1 per cent of iodine added, the other receiving mixed ethyl esters without iodine. Of 50 patients from these two groups that have been paroled during the year, 27 took iodized esters and 23 plain esters, though all patients received plain esters for the first six calendar months of 1922. These figures represent 20 per cent of those receiving iodized esters and 21 per cent of those receiving plain esters.

The question of leprous eruptions, referred to in previous reports, is still unanswered. It seems probable that some toxin other than that due to the leprosy organism may play a rôle in the production of these outbreaks. In some cases constipation seems to be a cause, as in several patients an outbreak has subsided after the use of a cathartic. In one case the eruption is preceded by a swelling of the salivary glands, especially the sublingual.

In August, 1922, a group of 27 patients was vaccinated against smallpox. The vaccination was successful in 19 patients. Leprous eruptions of varying severity appeared in 11 of these patients, being most frequent in the nodular and mixed types of leprosy. The occurrence of an acute leprous outbreak in 11 of 19 patients successfully vaccinated, while the prevalence of similar outbreaks in the balance of the patients in the hospital was no greater than usual, strongly points to vaccinia (or a toxin elaborated by its casual organism) as an exciting factor of the leprous exacerbations. The acute symptoms were transient and no untoward influence upon the patients was observable.

The use of the esters intravenously has not given as definite results as desired. A few cases seemed to improve more rapidly, but in a majority of cases this was so slight that most of the patients have ceased taking intravenous injections.

During the first half of the fiscal year a group of patients received injections, intramuscularly and intravenously, of an antimony preparation reported to have been used with success in other countries. In the nodular and ulcerated cases no change for the better was noted

in the clinical or bacteriological findings; in the anesthetic type slight improvement occurred in a few cases, as evidenced by a slightly more rapid return of muscular power, when tested by the dynamometer. However, on comparison with a control group, who were treated with chaulmoogra derivatives alone, this improvement was so slight that it was not deemed advisable to continue the use of antimony to the exclusion of the ethyl esters of the fatty acids of chaulmoogra oil.

For a portion of the year a dentist was employed by the Territorial board of health to give dental treatment to the inmates of the hospital. This has been a great help to the medical officers and has resulted in improvement of the general health of the patients.

During the year a statistical study was made of leprosy in Hawaii, covering the years 1914 to 1921, inclusive; also a similar study of cases that have been paroled. Comparing the decade 1912–1921 with that of 1902 to 1911, and basing rates upon the United States census falling within each period, it was found that the incidence of leprosy in Hawaii was 45 per 100,000 for the 10 years 1902 to 1911, while for the period 1912 to 1921 it was 33 per 100,000. During the fiscal year ended June 30, 1922, 106 were admitted to segregation, of whom 23 were relapsed paroled patients, leaving 83 strictly new cases. Similar figures for the fiscal year ending June 30, 1923, were 89 admissions, of whom 16 were relapsed paroled patients, leaving 73 strictly new cases.

Considerable time has been spent on the development of compounds of the fatty acids of chaulmoogra oil with certain metals, particularly arsenic and mercury, in the hope of increasing the efficacy of the chaulmoogra derivatives thereby. Several attempts to produce leprous lesions in laboratory animals have been made, but, thus far, these efforts have been unsuccessful. A study of the reaction of the serum of lepers to various modifications of the Wassermann and kindred tests has been made. A study of the lesions of the nasal region has been made in a series of cases, and special methods of local treatment have been carried out with favorable results in several cases.

Ethyl esters of the fatty acids of chaulmoogra oil have been furnished to United States Marine Hospital No. 66 at Carville, La.; and to the Navy Department for use in the Virgin Islands, Santo Domingo, and Samoa. Small quantities, aggregating about 7 liters, have been sent to 10 foreign countries.

Hygienic Laboratory.

The work of the Hygienic Laboratory has continued under the direction of Surg. G. W. McCoy. In July, 1922, Passed Asst. Surg. R. E. Dyer was designated Assistant Director. Early in the year the following sections were formed as a part of the division of pathology and bacteriology: The section of nutritional diseases, under Surg. J. Goldberger; the section of infectious diseases, under Surg. J. P. Leake; and the section on pathology under Passed Asst. Surg. G. C. Lake.

Two classes of student officers, of six members each, were under instruction at the Hygienic Laboratory during the year. In each case the course covered approximately six months.

This feature of the laboratory activities is very important to the service, serving as it does to furnish the officers who attend the

courses with the latest information on a great variety of public-health methods with which they will be called upon to deal.

Several workers from abroad, some of whom spent several weeks at the laboratory, have been given such aid as the facilities permitted.

During the year the laboratory has had the advantage of close association with Prof. Frederick P. Gay, recently of the University of California and now of Columbia University, New York. Professor Gay and his associate, Mr. Lewis Morrison, carried on at the Hygienic Laboratory investigations on the fundamental nature of the immunity to streptococcus infections.

Library.—At the end of the fiscal year 1922–23 the library of the Hygienic Laboratory contained 10,275 bound volumes, of which 518 were accessioned during the year. In addition, there is a special library of about 400 volumes and there are over 500 volumes of duplicate reports and journals for exchange. The library also has over 12,000 pamphlets and reprints, most of them classified and catalogued. Current periodicals to the number of 211 are received regularly, together with some 65 bulletins and other publications of State and municipal health departments. The catalogues contain in the neighborhood of 100,000 cards, 35,675 of which are printed Library of Congress cards.

There were borrowed from other local libraries during the year 1,147 volumes and lent to other libraries 43 volumes. The circulation during the year has entailed the charging of some 7,500 volumes and periodicals, an average of about 25 a day.

From February 4 to June 30 over 1,500 bibliographic references have been prepared for the staff and field service, together with a number of photostat copies of journal articles needed in the field.

In view of the ever-broadening scope of the research work carried on in the laboratory, and the growing personnel, there is urgent need for the completion of a number of sets of scientific periodicals, much in demand by workers and therefore difficult to borrow from other libraries. Some progress is being made in this direction, but more funds are needed, both for equipment and for personnel.

DIVISION OF PATHOLOGY AND BACTERIOLOGY.

Biologic products.—The domestic manufacturing laboratories were inspected, as is customary, and the manufacturing laboratories in Europe were also inspected, these being the first foreign inspections since the winter of 1919–1920. Among the European laboratories were a number that sought license for the sale in the United States of alleged cures for tuberculosis; none falling in this class was recommended for license, as none gave trustworthy indication of having effective treatments of tuberculous infections. In each case, however, the proponents of the material under consideration were given an opportunity to convince the inspector of the usefulness of their preparations.

Recommendation for license was declined in the case of a number of laboratories because of defective methods or methods which did not meet United States requirements, although these laboratories were producing for consumption in their own countries and for export to other European countries.

The chief research under the head of biological products during the year has been in connection with the standardization of pollen extracts. This has required a considerable volume of clinical work having for its object the determining of an unquestionably effective extract from a prophylactic point of view. The clinical work is being correlated with laboratory tests and if the preparation proves satisfactory a standard may be adopted.

The standardization of antidysentery and antianthrax serum has been interrupted so often by press of other work and has been handicapped so seriously by the requirement of personnel for more important problems that but little progress has been made. These serums are of relatively little importance in the United States, but, as the evidence indicates that they are clinically of value, it is proposed, as opportunity affords, to work to the end of attaining definite standards in each case.

Four thousand two hundred and twelve biological specimens were tested during the fiscal year 1923. The following tabulation gives the data in detail:

Routine tests of biologic products.

Product.	For purity.	For potency.	Total.	Product.	For purity.	For potency.	Total.
Diphtheria antitoxin	123	139	262	Animal epidermal extract	9		9
Tetanus antitoxin	30	30	60	Animal food extract	11		11
Botulinus antitoxin	19	16	35	Vegetable food extract	14		14
Antipneumococcic serum	103	125	228	Catgut	6		6
Antimeningococcic serum	105	119	224				
Antidysenteric serum	18	23	41	Total			2,919
Antistreptococcic serum	48		48	Arsphenamine and allied preparations:			
Miscellaneous serums	42		42	For composition..... 377			
Tuberculins	62		62	For determination of purity (non-toxicity)..... 796			
Rabies vaccine	35	17	52	For determination of potency (trypanocidal value).. 120			
Vaccine virus	43		43				
Miscellaneous vaccines	589		589				1,293
Pollen extracts	125		125				
Antityphoid vaccines	99	61	160				
Diphtheria toxin antitoxin mixture	390	381	771				
Diphtheria toxin (Schick test)	15	122	137	Grand total			4,212

International standards.—In September, 1922, a meeting was held at Geneva, Switzerland, under the auspices of the health section of the League of Nations, having for its object the adoption of international standards for the antitoxins of diphtheria and tetanus. There was no difference of opinion with respect to the desirability of adopting the Ehrlich unit for diphtheria antitoxin; indeed, the American unit is the equivalent of the German unit. The committee having the matter under consideration failed to agree on the adoption of any existing unit for tetanus antitoxin and proposed the creation of a new unit; it was decided that the new unit should be one-half the strength of the present American unit, though no scientific reason is advanced as to why such a new standard should be adopted when there is in existence and in wide use a very satisfactory standard double the strength of the proposed new one. It is felt that the unit adopted in 1907 by the United States Government on the basis of recommendations made after exhaustive studies of the subject by a committee of distinguished experts should not be discarded unless

a unit is proposed which presents definite superiority over the one now in use in the United States.

A comparison of the control of biologic products in the United States and in Europe leaves one with the definite conviction that this country is so far in advance in its legislative and regulatory control of these preparations that foreign Governments will necessarily take cognizance of the experience of the United States in connection with control methods.

SPECIAL INVESTIGATIONS.

Nutritional diseases.—The investigation on nutritional diseases, carried on under Surg. Joseph Goldberger, has been a continuation of the studies begun in the preceding year, namely (1) A study of the reaction presented by dogs fed on a diet that in human beings would be pellagra-producing; (2) The supplemental value of certain proteins in relation to such diet; (3) The amino-acid efficiency in such diet. Interesting results have been obtained which will be tested in the treatment of human cases of pellagra. Considerable time and labor were expended during the second half of the present period on the purification of certain proteins in quantities adequate for use in the studies on pellagra and the treatment of human cases. It may be noted that these studies were and are now being carried on in close cooperation with the field investigations of pellagra.

It was found necessary to discontinue temporarily the studies begun during the preceding fiscal year for the purpose of developing optimal diets for certain species of laboratory animals, on account of the pressure of work along the other lines mentioned.

Tularæmia.—The outstanding results of the investigations carried out during the year by Surg. Edward Francis in connection with this disease are (1) the finding of infection with *Bacterium tularense* of rabbits exposed for sale in the Washington, D. C., market. The animals had come from various parts of the country and suggest a wide distribution of the infection; (2) the establishment of the fact that infection in man is more frequent and more widespread than had hitherto been known.

The organism causing tularæmia has been grown on various new media, particularly those containing cystine. Studies of an immunological nature are now under way.

Botulism.—Associate Bacteriologist I. A. Bengtson has done much work on the classification of the botulinus group of organisms and has proposed a grouping which should receive general acceptance. By the isolation of single cells and the preparation of toxins from cultures so obtained some remarkable facts in bacterial variation have been established.

Pneumonia.—Investigations have been continued in connection with the wards of Bellevue Hospital, New York City, and remain under the direction of Special Expert Russell L. Cecil. No outstanding accomplishment is recorded for the year, though it has been shown that experimentally a nontoxic antigen may be prepared and that the subcutaneous use of a special modification of antipneumococcus serum is apparently as effective as the intravenous use of the same preparation.

Diagnostic work.—The following routine diagnostic examinations have been made:

Heads for rabies	49	Wassermanns	5,407
Sputum	34	Milk	16
Urine	109	Blood counts	68
Tissues	247	Feces	17
Cultures	412	Miscellaneous	297
Water	149		
Smears	49	Total	6,854

The following routine clinical work was done:

Administered:	
Typhoid vaccinations	62
Physical examinations	102
Smallpox vaccinations	143
Antirabic treatments	2
Diphtheria toxin antitoxin mixture	18
Diphtheria toxin (Schick test)	16
Diphtheria antitoxin	3
Total	346

Tuberculosis.—The work on tuberculosis in the division of pathology and bacteriology has been discontinued for lack of a suitable scientific worker to direct it. The meager resources hitherto available have been transferred to the division of pharmacology in connection with chemotherapeutic studies on tuberculosis.

Milk pasteurization.—In cooperation with a group of representative governmental control agencies and representatives of the milk industry a representative of the Hygienic Laboratory participated in a series of experiments conducted at Endicott, N. Y., for the purpose of determining the effectiveness of the pasteurization of milk inoculated with various pathogenic organisms. The observations made relate to the destruction of typhoid bacilli and bovine and human tubercle bacilli in milk artificially inoculated with these organisms and then pasteurized under actual conditions in the plant selected. The results confirm the fundamental soundness of accepted principles and demonstrate the care necessary in carrying out the operations if consistent results are to be secured.

NEW STUDIES.

Drug addiction.—Investigations on this subject have been taken up in conjunction with the work of the division of pharmacology from a clinical and experimental point of view and although the work is not sufficiently far advanced to forecast results it may be said that so far as the work has been carried animal tests give no support to the view that the blood serum of addicts contains either toxic or antidotal elements. Nothing in the clinical or field studies negatives the view generally held by physicians that inaccessibility of the drug is the most important element in the prophylaxis and cure of opium addiction. The investigations indicate that certain rather sensational claims which have been made public as to the prevalence of addiction and the amount of narcotic drugs consumed in this country have been based upon erroneous calculations. The problem is still sufficiently serious, however, to warrant determined and continued efforts toward its solution.

Malta fever.—The chief new activities of the division have been the study of Malta fever growing out of an outbreak at Phoenix, Ariz., in the summer of 1922. This gave Associate Bacteriologist A. C. Evans an opportunity to compare strains of recent human origin with those from other sources and permitted the study of the relation between *B. abortus* (Bang) and the Malta fever organisms. The work confirms the view previously asserted by Miss Evans that, aside from virulence, the two organisms are indistinguishable, although the whole class falls into several serological groups, without special reference to the origin of the particular strains.

DIVISION OF ZOOLOGY.

Prof. C. W. Stiles has remained in charge of this division, but fully half of his time has been occupied in work as chairman of the board on excreta disposal.

International Commission on Zoological Nomenclature.—Cooperation with the International Commission on Zoological Nomenclature has continued. A considerable number of cases have been presented by investigators in the United States Army, United States Navy, United States Department of Agriculture, United States National Museum, United States Fish Commission, by the Hygienic Laboratory, and by investigators in various laboratories and universities, especially of the United States, England, Canada, India, and Australia. Many of these were of such a nature that they could be settled on the basis of the rules by informal opinions by the professor of zoology, who has continued to serve as secretary of the commission. Several questions have been reduced to formal opinions which have been referred to the full membership of the commission.

Index catalogue of medical and veterinary zoology.—The entries in the card catalogue are nearing completion; the first draft of the manuscript on the parasites of man has been prepared, and that on the parasites of the genotypes for the genera of domesticated and laboratory animals has been begun.

Examination for diagnosis of intestinal parasites.—This part of the routine work of the division has been continued throughout the year. Specimens have been examined for the National Training School for Boys, for various Government hospitals, State boards of health, universities, and practicing physicians.

Special detail.—For about four months the professor of zoology was detailed to visit the Pacific coast to study certain zoomedical features of the immigration problem, especially clonorchiasis.

DIVISION OF PHARMACOLOGY.

The division of pharmacology has remained under the direction of Prof. Carl Voegtlin.

Chemotherapy of syphilis.—Sulpharsphenamine: A process for the manufacture of sulpharsphenamine has been worked out and several American manufacturers are now producing this drug on a large scale. Experimental work has shown that sulpharsphenamine has certain advantages over the older preparations. It is much more stable in solution and can be injected in moderate doses subcutaneously and intramuscularly without producing serious local reac-

tions. Extensive experimentation has revealed the fact that it has a greater penetrative power for tissues, as compared with arsphenamine and neoarsphenamine.

Mechanism of arsenic action.—Observations were made which throw much light on the chemical reactions involved in the toxic and therapeutic action of arsenicals. The active form of arsenic reacts with certain sulphur-containing constituents of protoplasm, which are concerned in biological oxidations and reductions. These fundamental findings contrast with the hypothetical considerations (side-chain theory of Ehrlich) by direct and concrete evidence of the chemical nature of the protoplasmic constituents which react with arsenic.

Trypanocidal test.—Further work has shown that the trypanocidal test, as elaborated in this laboratory, is of value for the control of the therapeutic potency of arsenicals, though the practical application of the test is beset with considerable difficulty. Additional evidence was obtained as to the nature of acquired arsenic resistance.

The interesting discovery was made that the drug resistance of parasites is changed, at least for a considerable period, by the relatively brief sojourn of the parasites in the body of a different animal than the one in which the drug resistance is tested.

Osmotic pressure of neoarsphenamine and alkaline solutions of arsphenamine.—It was found that the osmotic pressure of solutions made from different lots of the same brand and of different brands varies considerably. The concentration of neoarsphenamine and arsphenamine which is approximately isotonic with blood was established.

Chemotherapy of pneumococcus infection.—It was found by extensive experimentation that the white rat is a suitable animal for work on the chemotherapy of pneumococcus infections. A large variety of different drugs was tested as to their therapeutic potency in this disease. With exception of optochin, only negative results were obtained.

Permeability studies.—The purpose of this investigation has been the elucidation, by means of quantitative methods, of the manner by means of which chemicals penetrate into living cells. Work was conducted on various bacteria and red cells, using an electric conductivity method for measuring permeability. In other work on a large single-celled organism (Valonia) it was feasible to follow the penetration of various chemicals into the cellsap by means of direct chemical or physico-chemical methods. Numerous interesting observations of a fundamental nature were made which contribute considerably to a proper understanding of the mechanism of the penetration of chemicals into living cells. They are of a highly technical nature and will not be detailed here, with exception of the discovery that the penetration of acid and bases is not only dependent on the H-ion concentration but also to a great extent on the nature of the respective anions and cations.

Pituitary standardization.—The objections to previous methods of the bio-assay have been overcome by the elaboration of a reliable method which yields results with 20 per cent accuracy. The method is based on the preparation of a dried standard pituitary powder, made by a special process from fresh posterior lobes of beef gland. The great advantage of this new standard is that the powder has the

same activity at any season of the year, that it keeps its activity unchanged for a very long time, and that it evidently contains the whole pressor and oxytocic activity of the fresh gland. By the use of this standard it was shown that commercial preparations have a variation in activity of about 800 per cent.

Insulin standardization.—Systematic work was begun in the last quarter of the fiscal year on this subject. The method in use at present requires a large amount of work and an enormous number of animals. It was found that there exists a considerable individual variation in susceptibility of different animals of the same species to the drug. A tentative method has been worked out which is based on the determination of the minimum lethal dose of the drug.

Tuberculosis studies.—Considerable work was done on the influence of variation of diet on the course of experimental tuberculosis. This problem is in need of investigation, as experimental data are almost completely lacking. Particular attention has been paid to the influence of a relative deficiency of Vitamine A on tuberculosis in the guinea pig and the white rat, but results are not ready for reporting.

Cancer.—Toward the end of the year work was begun on the experimental production of malignant growth in rabbits by the repeated application of certain irritants to the skin. It is hoped to produce new growth with chemically pure substances instead of with such complex mixtures as coal tar. Successful results would contribute considerably to the knowledge of the cause of cancer, and would furnish means of studying therapeutic measures.

Various chemicals were prepared with a view of testing their influence on a certain rat carcinoma.

Cooperation with the committee of revision of the United States Pharmacopœia and the committee of revision of the National Formulary.—Hygienic Laboratory Bulletin No. 131, entitled "Digest of Comments on the Pharmacopœia of the United States of America and on the National Formulary for the Calendar Year 1920" was printed and distributed. The preparation of the manuscript for the 1921 digest was begun, and a considerable amount of the abstracting of the literature for 1922 was completed. The amount of literature to be abstracted is steadily increasing, and it is becoming more and more difficult to review completely this literature without additional assistance.

Miscellaneous.—A number of drugs were examined for the purveying depot of the Public Health Service and for other offices. Expert opinion was furnished on questions of a toxicological, pharmacological, and physiological nature.

Staff meetings were held for the discussion of the work which is being carried on by the division.

DIVISION OF CHEMISTRY.

Oxidation-reduction equilibria.—The division of chemistry, under the direction of Prof. William Mansfield Clark, is carrying on an extensive, systematic investigation of the fundamental principles of biological oxidation and its counterpart, reduction. Hitherto interest in biological oxidation has centered in the mechanism by which the oxygen of our atmosphere enters the chemistry of life. The division of chemistry is proceeding on the assumption that fur-

ther investigations of this mechanism will not be as profitable as an exact quantitative investigation of energy relations involved in the processes underlying and independent of the direct participation of atmospheric oxygen.

The chief results of the investigations are: First, definite advances in technique, which have made practical the effort to obtain final publishable data on certain oxidation-reduction systems; second, the confirmation by exact measurements of the principles theoretically deduced; third, the unification of literature on certain aspects of the general problem; and, fourth, the accumulation of accurate data upon dyes which will become part of a system of indicators for the colorimetric measurement of oxidation-reduction intensities in biological processes.

The investigation has required extensive research in the preparation and purification of organic compounds.

Biological oxidation reduction.—Some of the preliminary work was continued and fair agreement was found between the potentials of bacterial cultures measured electrometrically and by means of indicators. Certain compounds of physiological importance were prepared and made ready for electrode studies.

Attempt to isolate an antineuritic vitamine.—It is becoming ever more apparent that vitamines are essential to nutrition not only for the maintenance of general well-being but also for the proper development of special tissues. However, in spite of general popular interest and of extensive scientific investigation by means of animal feeding, comparatively little has been learned of the chemical nature of any vitamine. The division of chemistry is persisting in this discouraging search. Previously reported fractionations of vitamine-containing portions of yeast have been found to have high antineuritic properties, but have resisted chemical purification. Recently new methods have been applied, but the long period required to test the activities of various preparations makes it impossible to state conclusions at this writing.

New acid-base indicators.—The continued enlargement in the field of usefulness of indicator measurements of hydrogen-ion concentration has required perfection of the system. Starting with the known properties of sulphonphthalein indicators already in use, the properties of certain substituted sulphonphthalein indicators were predicted. Five new compounds were then synthesized and their properties found to confirm the prediction. These indicators supplement those in use. Among the new compounds tetra-bromo-m-cresol sulphonphthalein (brom cresol green) should be particularly useful as a substitute for the unstable methyl red now in use. Attention has been called to the value of the new indicators in bacteriological work and in the control of acidity in the alum process of water purification.

Analysis of arsenicals.—The division of chemistry has charge of the chemical analysis of arsenicals. During the year 377 samples were analyzed.

Research on analysis of arsenicals.—Continued modification of arsenical drugs necessitates continued search for improved methods of analysis. Previously reported work on the sulphate in neoarsphenamine and sulfarsphenamine has been followed by a study of total sulphur. A simplified method suitable for routine examinations has been developed.

Acid-base equilibria of arsenicals.—Arsenical drugs have been developed with little regard to the acid-base equilibria of the blood, and largely for this reason have required the elaboration of special technique for their injection. The failure to appreciate the acid-base properties of arsphenamine is believed to be the cause of accidents in the use of this drug, and because of the importance of the subject a careful review of work previously reported was made. This included the development of a method of checking the proper alkalinization previous to injection. The investigation has been submitted for publication as a Hygienic Laboratory bulletin.

Methods for the chemical analysis of sera.—In cooperation with the division of pathology and bacteriology the division of chemistry has undertaken an investigation of methods suitable for the routine chemical analysis of sera. This included a study of the applicability of the refractometer and of micro methods for the determination of chloride, sulphate, total protein, total nonprotein nitrogen, and amino nitrogen. A system is being developed which promises to be an aid to the biological control of material such as diphtheria antitoxin.

Alum process for clarification of water.—The Nation has long since become so densely populated that municipalities have ceased to depend upon uncontaminated watersheds and have installed extensive works for the purification of water supplies. Occasional investigations of the chemical processes involved have been conducted. The division of chemistry is not situated where it can well undertake a broad program of research on these problems, but a thoughtful analysis of the alum process has shown that there are certain fundamental data which can be accumulated by experiments on a laboratory scale. The division, in cooperation with the office of stream pollution investigations, has previously reported on the optimal hydrogen-ion concentration for floc formation in alum solutions. Another phase of the problem was then investigated. It has recently been found that the composition of the floc in pure solutions depends very largely upon the hydrogen-ion concentration at which it is formed. This analytical investigation is being extended, with the aid of the office of stream pollution investigations, in the expectation that it will reveal the chemistry whereby the aluminum compound precipitated carries with it the material it is intended to remove.

Preliminary studies were made upon apparatus suitable for the automatic control of pH in alum dosage.

Miscellaneous.—Facilities and analytical aid were afforded two workers of the office of industrial hygiene who were engaged chiefly in a study of industrial zinc poisoning and in a study of the properties of a new gas for the fumigation of ships.

Assistance was given to pellagra studies by the preparation of vitamines and salt mixtures for feeding experiments and the analysis of various foodstuffs.

A large number of standard solutions were prepared for other divisions of the Hygienic Laboratory or for other offices of the Service.

Viruses, Serums, Toxins, and Analogous Products.

In connection with the enforcement of the law of July 1, 1902, governing the manufacture, importation, and sale of viruses, serums, toxins, and analogous products, inspections were made of American and European establishments holding or applying for licenses.

The routine has consisted of the inspection of the plants of manufacturers with a view to determining their compliance with the standards which have been established as essential to the holding of licenses, and the examination of the products at the Hygienic Laboratory.

At the close of the fiscal year, 40 establishments held licenses for interstate traffic in biologic products, 34 of these being American concerns and 6 foreign firms. During the year the licenses of 2 American firms were revoked and 1 was suspended, and the licenses of 2 foreign firms were revoked. Two American firms were licensed, in addition to the 35 reported last year.

There are now 104 different biologic products licensed for interstate traffic.

The laboratory investigations relating to viruses, serums, toxins, and analogous products are reviewed on pages 56–58.

DISSEMINATION OF INFORMATION.

The results of studies and investigations of the division have been made available for the use of the public by various publications issued, and by correspondence, typewritten reports, interviews, lectures, and conferences. Recommendations are submitted, when requested, in regard to the improvement of existing conditions.

Publications.—All scientific papers and articles on health topics prepared by the personnel of the Service for publication are submitted to this division for review and permission to publish. During the past year this work has included 5 Hygienic Laboratory bulletins, 15 Public Health bulletins, and 146 articles for the Public Health Reports or outside scientific journals, of which more than half represent the activities of the Scientific Research Division.

Meetings.—Representation of the Service, by attendance of its officers at meetings of scientific and sanitary associations and congresses, which is arranged under this division, is an important part of public health work. In most cases the representatives have presented papers relating to the functions or achievements of the Service, especially with reference to the results of scientific investigations. Important information is gained by the officers through these details, and the very essential contact with outside workers in similar lines is maintained.

DIVISION OF DOMESTIC (INTERSTATE) QUARANTINE.

In charge of Asst. Surg. Gen. W. F. Draper.

The activities of this division during the past fiscal year to suppress epidemics and to prevent the interstate spread of disease have included (1) plague suppressive measures, (2) activities for the eradication of trachoma, (3) the conduct of studies of and demonstrations in rural sanitation, (4) the carrying out of service policies for the prevention of epidemics by assisting State health departments in establishing and improving divisions of communicable diseases and sanitary engineering, (5) assisting the National Park Service of the Interior Department in providing adequate medical attention and improving the sanitary condition of the national parks, (6) control of water supplies used for drinking and culinary purposes by interstate carriers, (7) supervision over sanitary and health conditions on interstate carriers affecting the travel of persons and the transportation of things, and (8) mosquito-control measures to prevent the possibility of introduction of yellow fever from Mexico.

PLAGUE SUPPRESSIVE MEASURES.

In view of satisfactory results obtained during the past and the fact that no new outbreak occurred, the plague station at Galveston, Tex., was discontinued on January 15, 1923, and the plague station at New Orleans was discontinued on June 30, 1923. The operations for the control of plague in California have been continued, and squirrel-free zones have been maintained between infected territory and the rat population of San Francisco, Oakland, and Berkeley. Rat-trapping measures were carried out in San Francisco.

The assistance rendered to local authorities in New England seaports in rat-trapping measures and in examining the rats caught, which began during the last fiscal year, has been continued also with satisfactory results.

PLAGUE SUPPRESSIVE MEASURES, NEW ORLEANS, LA.

During the fiscal year ending June 30, 1923, all plague suppressive measures in the city of New Orleans were conducted, as in former years, under the supervision of the United States Public Health Service, working in close cooperation with the New Orleans City Health Department and the Louisiana State Board of Health. Throughout the year no plague infection was found, either human or rodent.

As the last case of human plague occurred August 20, 1920, and the last plague-infected rat was trapped August 10, 1921, and no plague-infected rat was found among approximately 200,000 rats examined since August 10, 1921, the Public Health Service withdrew from plague eradication in New Orleans June 30, 1923.

Organization.—Passed Asst. Surg. M. S. Lombard remained in charge of the campaign until August 22, 1922, when he was relieved by Surg. C. L. Williams, who remained in charge until the close of the year. Outgoing quarantine procedures were in direct charge of Acting Asst. Surg. R. E. Bodet.

Outgoing maritime quarantine.—As no infected rat has been found since August 10, 1921, ships from clean ports have been permitted to lie alongside of rat-proof docks without fending off or rat guarding. At the close of the fiscal year all of the New Orleans docks had been rat proofed except three. The rat proofing of two of these is now in progress, and the third will be rat proofed when these are completed. As heretofore, ships from infected ports have been required to put rat guards on lines and to fend off at the docks until they have been fumigated.

The fumigation squad has been maintained to fumigate all ships from plague-infected ports and to fumigate once every six months ships engaged in foreign commerce.

Tabulated operations of quarantine measures are as follows:

Number of vessels inspected for rat guards	5,780
Number of vessels fumigated with sulphur	0
Number of vessels fumigated with cyanide gas	535
Pounds of sulphur used	0
Pounds of cyanide used	45,013
Pints of sulphuric acid used	68,521
Total number of "vessel fumigated" certificates issued	535
Clean bills of health issued	2,438
Foul bills of health issued	161
Number of vessels cleared	2,599
Total number of bills of health issued (including additional ports of call)	5,492
Total amount of charges reported to collector of customs	$16,928
Total number of rats killed by the fumigation of vessels	1,803

Laboratory.—The laboratory continued examination of rats as heretofore. Tabulated laboratory procedures are as follows:

Species.	Number of rats examined.		
	Male.	Female.	Total.
Mus norvegicus	26,300	21,144	47,444
Mus rattus	1,867	1,400	3,267
Mus alexandrinus	3,297	2,498	5,795
Mus musculus	3,792	2,767	6,559
Wood rats	5	4	9
White rats	9	3	12
Putrid			4,154
Total			67,240

Trapping.—Trapping of rats was continued throughout the year with a reduced force. The trapping area was greatly reduced so as to include only the water front and business district, particularly locations where foodstuffs are stored. Trapping throughout this year has been principally maintained for the purpose of determining the presence or absence of infection through the examination of rats trapped.

Rat proofing.—On account of greatly reduced personnel, rat-proofing inspectors confined their attention almost exclusively to new buildings.

About the middle of the year a survey of 1,000 buildings in 30 city blocks, selected in various portions of the city to give a fair sample, indicated that the buildings in the city at the present time are approximately 66 per cent rat proof.

Rat-proofing operations are given below in tabulated form:

Notices served		101
New buildings inspected		3,339
Number of premises inspected		1,256
Number of premises abated		1,172
By elevation	516	
By marginal wall	88	
By concrete floor and wall	276	
By minor repairs	266	
Total buildings rat proofed		1,146
Buildings demolished		26
Total buildings rat proofed to date		173,536

Close of the campaign.—While service plague eradicative activities in New Orleans were discontinued at the end of the fiscal year, the city of New Orleans has agreed to maintain a limited rat-proofing force and a laboratory for examination of rats. This is being done as a precautionary measure, although it is believed that the infection has been eliminated.

PLAGUE SUPPRESSIVE MEASURES, GALVESTON, TEX.

Plague suppressive and eradicative measures in Galveston, Tex., were continued with Surg. H. F. White in charge until December, when he was relieved by Surg. G. M. Guiteras. The station was discontinued on January 15, 1923. Trapping operations were discontinued on October 15, 1922.

Fumigation.—The following table shows the fumigation operations from July 1, 1922, to January 15, 1923:

Number of vessels fumigated	66
Number pounds of cyanide used	5,910½
Pints of sulphuric acid used	8,808¼
Number of vessels fumigated with cyanide gas	55

Rat trapping.—The following rodents were secured from July 1, 1922, to January 15, 1923. No plague infected rodents were found:

Rodents secured from fumigated ships	77
Rodents secured from premises	3,451

PLAGUE SUPPRESSIVE MEASURES, SAN FRANCISCO, CALIF.

The service activities in plague suppressive measures at San Francisco have been carried out under the same general procedure as followed last year: (*a*) Operations in the field for ground-squirrel control; (*b*) sanitary inspections in San Francisco; and (*c*) work in the Federal laboratory.

The importance of continued squirrel-control measures has been emphasized by personal conferences with health officers, county horticultural commissioners, and county supervisors, and at a special conference with the health officers in California at their annual meeting.

The danger of an outbreak of bubonic plague as long as foci of infection exist in ground squirrels should be apparent to anyone who gives this subject serious consideration, and the probability of extension of plague to rats in towns from squirrels in the environments constitutes a real danger that has been forcibly presented to the State and county authorities.

The value from a public-health standpoint of a rat survey in San Francisco and Oakland to determine the possibility of plague infection of these rodents was again presented, but the health officers

were unable to secure the necessary appropriations for this purpose. This effort has been backed by correspondence and interviews. The matter will again be urged by the city board of health and health officer of San Francisco during the next fiscal year, and it is hoped a sum will be set aside for this purpose.

During the year one case of human plague occurred at Soquel, Santa Cruz County, and plague infection in squirrels was demonstrated in this county, although only a small number were shot for examination.

The history of this human case showed that the disease was acquired from squirrel contact, and illustrates the constant menace that exists from dissemination of plague by these rodents in California.

It has been possible during the year to carry out limited shooting operations in the counties in which work has been prosecuted. While shooting of ground squirrels could be practiced for a period of only two weeks, the examination of these rodents gave some index of plague foci. Eight plague-infected squirrels were proved in Contra Costa County within 2 miles of a center of population. It is believed that plague still exists in the squirrels in Alameda County and that it could have been proved if it had been possible to have continued shooting operations on a more extensive scale.

Plague was proved to exist in 1920 in the ground squirrel in ten counties of California, was again demonstrated in two counties in 1922, and has again been proved in 1923. It is certain that plague foci exist in the ground squirrels in California, and this must be recognized as a potential danger.

FIELD OPERATIONS FOR THE CONTROL OF GROUND SQUIRRELS.

On account of the limited appropriations available, it has been possible to operate only in the counties of Alameda, Contra Costa, San Francisco, and San Mateo. During the year intensive work has been carried out in the districts adjacent to centers of population and considerable progress has been made in creating a squirrel-free zone around these towns and cities.

The great danger of dissemination of plague from the squirrel reservoirs is the transmission of the disease to rats from contact with these rodents. Although a great improvement in the situation has been made by these intensive operations, it must be continued to produce satisfactory results.

The following tabulated statement presents the field operations:

Number inspections	312
Number reinspections	4,933
Number acres inspected	91,043
Number acres reinspected	1,450,931
Number acres treated with waste balls	74,768
Number acres treated with grain	220,302
Number acres treated with destructors	300
Number holes treated with gas balls	200
Number holes treated with CS_2	472,434

Special work in city of Oakland.

Number of acres treated with carbon bisulphide	421
Number of holes treated	2,160

Special work in city and county of San Francisco.

Number of acres treated with poisoned grain	5,450

Material used.

Number pounds poisoned grain	148, 249½
Number gallons carbon bisulphide	7, 811½
Number waste balls used	472, 134
Number gas balls used	200

Poisoned barley mixed for private landowners under supervision of employees of service.

Number pounds	82, 229

Sanitary inspections performed in the city of San Francisco on complaints referred from city health department and from other sources.

Rat complaints	597
Manure and stable complaints	43
Chicken, rabbit, pigeon, etc., complaints	250
Garbage and defective garbage cans	101
Rubbish complaints	31
Plumbing complaints	27
Insanitary premises, including shacks	364
Stench complaints	79
Goat, dog and cat complaints	48
Mosquito, fly and flea complaints	25
Swine complaints	8
Plumbing complaints, referred to board of health	17
Lots from which stagnant water has been pumped	2
Miscellaneous	72
Total	1, 664

NOTE.—All the above complaints were investigated by the inspectors, the necessary notices prepared and sent out, and reinspections made to determine whether the existing nuisances were abated.

Measures taken against rats.

Number of premises inspected	17, 460
Number of nuisances abated	2, 988
Number of complaints investigated	1, 664
Number of garbage cans installed	1, 625
Number of chicken yards abandoned	214
Number of chickens, pigeons, rabbits, etc., disposed of	3, 750
Number of vacant lots cleaned	95
Number of basements cleaned	281
Number of yards cleaned	149
Number of premises cleaned of rubbish	146
Number of floors torn up	182
Number of basements torn up	27
Number of yards torn up	74
Number of buildings destroyed	106
Number of stables destroyed	32

Measures taken for the permanent rat-proofing of old buildings, including food places.

Number of buildings rat proofed by concreting	243
Basements concreted (19,300 square feet)	13
Floors concreted (349,171 square feet)	280
Yards, passageways, sidewalks, etc., concreted (5,500 square feet)	13
Total area concrete laid (square feet)	373, 971
Number area walls installed (33,725 cubic feet)	87
Number floors rat proofed with double floors and wire cloth between (25,400 square feet)	21
Lens lights replaced	316
Openings in walls, ceilings and floors, and around pipes closed by wire cloth and cement	13, 044

Condemnation proceedings.

Number of buildings submitted to board of health for condemnation	164
Number of buildings acted on by board of health and condemned	132
Number of buildings acted on by board of health and not condemned	32
Number of buildings [1] abated following condemnation proceedings: By repair, 10; by demolition, 82	92
Number of buildings condemned and remaining unabated	69

[1] These include some buildings condemned during previous years, hence totals will not balance.

OPERATIONS OF FEDERAL LABORATORY.

The policy of previous years has been continued in the laboratory, in that in addition to procedures connected with plague-suppressive measures in California, the facilities have been made available for cooperation with other branches of the service and of the Government.

Operations have been conducted for the hospital and relief stations of the service on the Pacific coast, for the certification of water on Interstate carriers, and for the Veterans' Bureau, the Indian Medical Service and the National Park Service.

Investigations and experimentation have been pursued to determine the possibility of the spread of Chlonorchiasis on the Pacific Slope. A progress report of the investigations has been prepared for publication.

A case of Granuloma Coccidioides in the U. S. Marine Hospital at San Francisco has been determined, and a report of it prepared for publication.

A case of human plague in Santa Cruz County was investigated and proven.

Summary of laboratory work.—Laboratory work in connection with field operations:

Examination of rodents for plague:	
Rats from San Francisco and other localities	3,074
Rats from fumigated ships	1,228
Ground squirrels	4,324
Total	8,626
Serological examinations:	
Wassermann reactions	2,642
Widal tests	23
Total	2,665
Bacteriological examinations (culture and microscopic):	
Blood	24
Feces (for typhoid)	71
Urine (for typhoid)	44
Spinal fluid	1
Sputum	1
Other fluids	5
Catgut	26
Water examinations	75
Total	247
Bacteriological examinations with animal inoculations:	
Tuberculosis	22
Plague squirrel	20
Human plague	1
Total	43
Parasitological examinations:	
Human feces	236
Animal feces	4
Animal livers and bile	1,506
Total	1,746
Histological examinations	123
Miscellaneous	7
Autogenous vaccines	7
Total examinations and analyses	13,851

ASSISTANCE TO LOCAL AUTHORITIES OF NORTH ATLANTIC SEACOAST CITIES IN TRAPPING AND EXAMINING RODENTS.

These activities have been carried out through the district engineers of interstate sanitary district 1 in accordance with bureau policy as outlined on page 99 of the Surgeon General's annual report for 1922. From January, 1923, the director of public health district No. 1 was placed in supervisory charge of these activities in this region.

One of the main developments has been the commencement of rodent flea surveys in the ports of Boston, Mass., and New York, N. Y. The object of these surveys is to determine factors relative to the fleas found upon rodents which may possibly have an influence on the presence or absence of plague on the North Atlantic coast. The work has involved the trapping of live rodents, the collection of fleas from them, and the identification of the species by microscopic examinations. The work of making the flea identifications has been carried out by Surg. Carroll Fox. Accurate records of all the necessary data relative to the fleas have been kept. It is expected that considerable information of value will be obtained by the continuation of these surveys over a considerable period of time. The rats caught are examined also for plague lesions before being finally disposed of.

The rodent flea survey work at Boston, Mass., has been carried out by Acting Asst. Surg. Paul Eaton. The work commenced in October, 1922, and since that date trapping operations have been carried out by two trappers of the Public Health Service. Assistance has been rendered by the Boston city health department in furnishing transportation facilities and by utilizing part time city rat trappers for the work during a short period. The Bussey Institute, a branch of Harvard University, engaged in scientific research in entomology, has cooperated by furnishing laboratory space for the collection of fleas from the rats. A total rodent catch of about 775 rats has been collected. From these rats a total of about 400 fleas of *Ceratophyllus fasciatus* and *Xenopsylla cheopsis* species has been obtained.

The health department of Boston conducted a rodent survey during the months of July, August, and September, 1922, and also from the middle of December, 1922, to the middle of February, 1923. A total of about 2,500 rodents was caught and examined for lesions suspicious of plague.

The work of collecting fleas from live rodents was commenced by the New York City Health Department on April 18, 1923. A small force of local rat trappers has been employed in the work. The sanitary engineers attached to interstate sanitary district No. 1 have cooperated by demonstrating the methods to be employed, by assisting in the direction of the work, and by forwarding the fleas collected from the rodents by the laboratory bureau of the New York City Health Department to Surg. Carroll Fox for identification. To the close of the fiscal year more than 600 live rodents have been caught. The number of fleas collected has been about 1,000, practically all of which are of the *Ceratophyllus fasciatus* species. From July, 1922, to May, 1923, the New York City Health Department conducted a routine rodent survey, in which 18,242 rats were trapped and examined for plague lesions.

On September 5, 1922, a rodent survey was commenced at Providence, R. I., by the local health department in cooperation with the

Public Health Service. A force of three rat trappers has been employed continuously on the work. The rodents trapped are shipped to Boston, Mass., by express for examination for plague lesions at the rodent examination laboratory at the Gallops Island Quarantine Station. During the fiscal year about 5,300 rats were caught and examined for lesions suspicious of plague. The district engineer was active in obtaining the local appropriation for the work. Assistance was rendered in training the local rat trappers by detailing Foreman Rat-trapper Kemper Nevel to duty in Providence for a period of several weeks.

During the past fiscal year the local health department of New Bedford, Mass., has continued the rat survey commenced in that seaport in January, 1922. More than 2,700 rats have been trapped and examined for plague. Several visits have been made to New Bedford to support the local authorities in this work.

Several conferences were had during the year with officials of the health department of Philadelphia, Pa., relative to the institution of a rodent survey in that city. The local authorities have expressed their interest in having such a survey carried out in cooperation with the Public Health Service. It is expected that a rat survey at Philadelphia will be inaugurated during the ensuing fiscal year on the completion of the rodent examination laboratory at Marcus Hook Quarantine Station, to which place the rats that have been caught will be shipped for examination.

A very considerable amount of time and effort has been expended during the past fiscal year in cooperating with the New England Committee on Plague Prevention and Rodent Control. Under the auspices of this committee, an intensive study of the building codes of 14 New England seaport cities, with reference to their rat-proofing provisions, was made by the two sanitary engineers attached to interstate sanitary district 1. As a result of the study, a set of standard rat-proofing provisions for new construction and construction undergoing major alterations was prepared and submitted to the New England Committee on Plague Prevention and Rodent Control for approval. Prior to the close of the fiscal year the New England Committee on Plague Prevention and Rodent Control commenced a campaign for the incorporation of rat-proofing provisions similar to the suggested standard rat-proofing provisions in the building codes of seaport communities.

Trachoma.

As in previous years, the trachoma-prevention work has been conducted by means of ophthalmic hospitals, field clinics, and surveys.

At the close of the fiscal year ended 1922 there were 6 trachoma hospitals in operation—3 in Kentucky, 1 in Tennessee, 1 in North Dakota, and 1 in Arkansas. In accordance with the custom of moving these hospitals to a new field when the old location had fulfilled the work for which it was intended, three of the hospitals were closed in the course of the year—the one in North Dakota in December, 1922, and two in Kentucky in the spring of 1923. One of the Kentucky hospitals was transferred to Rolla, Mo., where it is to be opened July 24, in cooperation with the State board of health of Missouri. The other Kentucky hospital and the one in North Dakota will be reopened as soon as suitable locations can be selected.

During the fiscal year just ended the trachoma-prevention work has been handicapped by the fact that several of the eye specialists employed at the trachoma hospitals have resigned to enter private practice, and considerable difficulty is being experienced in finding specialists to assist in the trachoma-prevention work. It is hoped, however, that in the near future these vacancies can be filled and the hospitals relocated.

The temporary hospital at Pelham, Ga., which was closed in the spring of 1922, was reopened in April, 1923. This was done in response to urgent requests from the commissioner of health of Georgia and the local health authorities of Mitchell County because of the number of additional cases of trachoma that had been found since the closing of the temporary hospital. It is believed that it will not be necessary to continue the temporary hospital at Pelham for a period longer than six months, as it is thought that the additional trachoma cases can be cured within this period.

At the close of the fiscal year ended June 30, 1923, four trachoma hospitals were in operation—Pikesville, Ky.; Morristown, Tenn.; Pelham, Ga.; and Russellville, Ark. An additional hospital at Rolla, Mo., is practically ready for opening in a building which is furnished by the local community. This building has been altered and repaired, with steam heat and modern conveniences, so that it will be possible to conduct a modern eye hospital. The trachoma hospital located at Morristown, Tenn., has apparently accomplished the purpose for which it was established and will be relocated in Knoxville, Tenn. The chamber of commerce and other organizations of Knoxville are cooperating thoroughly with the service and are furnishing rent free a suitable building for the hospital. The necessity for locating a hospital in Missouri was clearly shown by surveys made by officers of the service, and reports from other sources. Trachoma is more prevalent in the southern portion of the State, where it heads the list of the causes of blindness. Reports show that 19.7 per cent of the cases of blindness in the State of Missouri are caused by trachoma.

Field clinics and surveys.—The importance of field clinics has been recognized more and more each year. For this reason a clinic unit was formed consisting of eye specialists, nurses, and a clinic manager. The majority of the clinics were held in the rural districts in the spring and summer months. They can not be held in winter owing to bad roads. Forty-three clinics were held in Kentucky, Tennessee, Ohio, West Virginia, Missouri and Arkansas during the fiscal year, at which 8,090 persons were examined and 813 cases of trachoma found. Three hundred and fifty-five operations were performed at these clinics, 112 under general anesthesia and the remainder under local anesthesia. The clinics were held in school houses, churches, court houses, or other available buildings with the cooperation of the local community. Each clinic lasted for from two to five days.

Trachoma surveys were made in Illinois, Missouri, Georgia, and Kentucky. The smaller number, as compared with last annual report, of cases of trachoma reported as cured is due to the fact that half of the trachoma hospitals were closed a portion of the time and also to the difficulty which is at all times experienced in seeing these cases again after a cure has been once effected. The number of cures reported in the table refers only to hospital cases. The number of

cures effected at the field clinics are not recorded; in fact this is practically impossible. However, it was the custom to hold a second trachoma clinic within a month or six weeks after the first, and the results, as seen in the old cases who applied at the second clinic, were extremely gratifying. Many cures were noted and the deformed eyelids on which plastic operations had been done at the previous clinic were greatly improved.

The service trachoma hospitals have been conducted with a reduction in cost as compared with the previous fiscal year, and the per diem cost of each hospital patient is less. The various States in which the trachoma work has been done have cooperated with the service in every way, including financial aid. The American Red Cross has continued the representative for whole-time duty in cooperating with and assisting the service trachoma clinics. This cooperation has been very practical and very necessary, since the Red Cross representative furnishes the cots, bedding, linens, etc. Appreciation is expressed for the cooperation and devotion of this valued Red Cross worker.

It is expected that the trachoma work in Missouri will be extended into the southern part of the State with field clinics immediately after the opening of the hospital, and it is hoped to include every county in this section of the State at least. The State board of health has promised very material financial aid, and it is believed that with this cooperation an effective and intensive trachoma campaign will be established.

Following are tables showing: (1) Dispensary and hospital relief, etc.; (2) education work, house-to-house visits, etc.; (3) field clinics.

TABLE No. 1.—*Dispensary and hospital relief, operations, etc.*

	Greenville, Ky.[1]	Jackson, Ky.[2]	LaMoure, N. Dak.[3]	Morristown Tenn.
Dispensary relief:				
Old cases all causes	240	695	130	829
Old cases trachoma	172	293	64	600
New cases all causes	322	475	199	537
New cases trachoma	98	122	36	112
Total attendance	562	1,170	329	1,366
Total number of treatments	563	1,596	359	1,392
Average daily attendance	1.9	4.1	2	3.7
Impaired vision from trachoma	45	97	17	45
Corneal opacity from trachoma	30	40	8	15
Blindness both eyes from trachoma	0	0	0	0
Blindness one eye from trachoma	2	1	0	0
Ulcer from trachoma	21	41	9	12
Pannus from trachoma	29	53	14	15
Entropion from trachoma	16	14	2	9
Trichiasis from trachoma	5	13	1	8
Photophobia from trachoma	38	109	12	82
Conjunctivitis	94	227	20	259
Glaucoma	0	0	0	0
Trachoma cases cured	32	17	22	16
Hospital relief:				
Remaining from previous year	12	11	13	9
Admitted during the year	104	149	53	161
Discharged during the year	116	160	66	162
Remaining at close of year	0	0	0	8
Days relief furnished	1,885	2,410	2,194	2,795
Rations furnished	3,417	3,562	2,894	4,211
Cost of rations	$1,758.12	$1,726.09	$1,161.40	$1,892.24
Operations:				
General anesthesia	0	5	10	4
Local anesthesia	57	116	21	208
Grattage	44	107	30	200
Entropion	13	13	1	8

[1] Closed Apr. 19, 1923. [2] Closed Apr. 13, 1923. [3] Closed Dec. 15, 1922.

TABLE No. 1.—*Dispensary and hospital relief operations, etc.*—Continued.

	Pelham, Ga.[4]	Pikeville, Ky	Russellville, Ark.	Total.
Dispensary relief:				
Old cases all causes	289	1,061	1,326	4,570
Old cases trachoma	177	673	1,063	3,042
New cases all causes	546	1,114	1,081	4,274
New cases trachoma	89	220	227	904
Total attendance	835	2,176	2,407	8,845
Total number of treatments	837	2,313	2,409	9,469
Average daily attendance	11.4	5.9	6.5	
Impaired vision from trachoma	7	177	198	586
Corneal opacity from trachoma	7	60	138	298
Blindness both eyes from trachoma	0	1	7	8
Blindness one eye from trachoma	2	5	14	24
Ulcer from trachoma	1	48	15	147
Pannus from trachoma	12	113	135	371
Entropion from trachoma	3	30	66	140
Trichiasis from trachoma	3	8	72	110
Photophobia from trachoma	32	127	130	530
Conjunctivitis	161	379	373	1,513
Glaucoma	1	0	1	2
Trachoma cases cured	15	15	58	175
Hospital relief:				
Remaining from previous year		18	11	74
Admitted during the year	51	325	234	1,077
Discharged during the year	35	332	237	1,108
Remaining at close of year	16	11	8	43
Days relief furnished	1,121	6,829	4,360	21,594
Rations furnished	1,433	8,490	6,070	29,987
Cost of rations	$537.56	$3,420.25	$2,508.63	$13,004.29
Operations:				
General anesthesia	35	35	31	120
Local anesthesia	16	218	289	925
Grattage	50	193	194	818
Entropion	0	36	88	159

[4] Opened Apr. 19, 1923.

TABLE No. 2.—*Educational work, house-to-house visits, etc,*

	Greenville, Ky.	Jackson, Ky.	La Moure, N. Dak.	Morristown, Tenn.	Pelham, Ga.	Pikeville, Ky.	Russellville, Ark.	Total.
Public talks given	122	48	11	0	0	2	115	298
People (estimated) in audiences	5,254	2,116	512	0	0	400	6,840	15,122
Pamphlets on trachoma distributed	405	102	189	8	2	158	387	1,251
House-to-house visits	20	64	29	7	0	0	2	122
People in houses visited	101	263	135	25	0	0	6	530
Trachoma cases in houses visited	6	20	30	12	0	0	1	69
Schools visited	86	36	10	33	1	3	78	247
Pupils examined in schools	5,252	2,003	389	6,890	40	1,000	6,387	21,961
Trachoma cases in schools	96	106	12	70	2	12	56	354

TABLE No. 3.—*Field clinics.*

Number of clinics held		33
Number of persons examined, all ages		7,602
Trachoma cases found		752
Suspicious cases found		154
Operations performed:		
General anesthetic	112	
Local anesthetic	243	
		355
Local people assisting		1,051
Physicians present		142

RURAL HEALTH WORK.

In the fiscal year ended June 30, 1923, the Public Health Service cooperated in demonstration projects in rural health work in 60

counties, or districts comparable to counties, in 17 States, as follows: Colbert, Lauderdale, Madison, Marion, Talladega, and Walker Counties, Ala.; San Joaquin County, Calif.; Clarke, Floyd, Glynn, Laurens, and Walker Counties, Ga; Dubuque County, Iowa; Cherokee County, Kans.; Mason County, Ky.; Washington Parish, La.; Cape Cod district, Mass.; Harrison County, Miss.; Cape Girardeau, Dunklin, Gentry, Greene, Jasper, Monroe, New Madrid, Nodaway, Pettis, Polk, and St. Francois Counties, Mo.; Cascade and Lewis and Clark Counties, Mont.; Santa Fe and Union Counties, N. Mex.; Cumberland, Edgecombe, Sampson, and Surry Counties, N. C.; Ottawa County, Okla.; eighth sanitary district, Vt.; Arlington, Carroll, Charlotte, Chesterfield, Grayson, Greensville, Henry, Mathews, Nansemond, Prince Edward, Pulaski, Roanoke, Smyth, Wise, and Wythe Counties, Va.; and Hancock, Logan, Marion, Mingo, Preston, and Taylor Counties, W. Va.

The plan of the work was the same as that followed in each of the several preceding fiscal years and is described in previous reports. The appropriation for the support of this activity is "for special studies of and demonstration work in rural sanitation." In the demonstration projects the rural sanitation work is made a part of a well-balanced, comprehensive program of health work and is conducted in cooperation with State and local health authorities. A whole-time local, county, or district health officer or sanitary officer is given a status of field agent in the Public Health Service and serves as director of the demonstration project. By having the work conducted on such cooperative basis, unnecessary overhead expense, friction, and lost motion are prevented. Every project presents a remarkable demonstration of economy with efficiency in public business. In the average project, five or six branches of health work, such as general sanitation of private homes and public places, malaria control, infant and maternity hygiene, school hygiene, etc., are carried out in the course of a year at a cost of one-fourth, or less, of what the cost would be if equally effective work were carried out by specialized field forces operating separately in each of such branches.

The appropriation for the rural health work of the Public Health Service in the fiscal year 1923 was again only $50,000. At the termination of the fiscal year 1922, $13,308.42 unexpended under contracts made during that year remained. Thus $63,308.42 was available for the support of the activity in the fiscal year 1923. Of this sum, $46,284.60 was expended in allotments for cooperative projects in counties, and $4,487.56 was expended for administration, supervision of local projects, and special studies of the problem of rural sanitation. The unexpended balance of the total sum available was included in allotments to some of the cooperative projects which, because of various local circumstances, could not be completed by the end of the fiscal year. With the existing differences between the Federal fiscal year and those of some of the States and localities in which the work is done, it would not be practicable, without lessening the degree of economy striven for, to arrange contracts so that the allotment of Federal funds to every project would be expended exactly by the end of the Federal fiscal year.

Along with the $50,772.16 of Federal money expended, about $400,000 provided from other sources was expended for the support

of the work in the demonstration projects. Thus this investment of Federal funds was met with odds of over 8 to 1 for the support of the work. The bulk of the money was appropriated from county treasuries. In some of the States allotments are made from funds appropriated to the State boards of health. In some of the projects financial assistance is obtained from civic organizations, such as local health associations, local Red Cross chapters, and the International Health Board.

The Federal Government's cooperation is evidently an important factor in causing local (county and municipal) authorities to appropriate for effective whole-time local health service. Repeated occurrences in the course of negotiations with State, county, and municipal governmental authorities within the last several years indicate consistently and beyond all reasonable doubt that critically needed and vitally important progress could be made in the rural health field if sufficient Federal funds were made available to enable the Public Health Service to extend its plan of cooperation in rural health work to a reasonable adequate degree.

Among the results obtained in the demonstration projects are lowered sickness and death rates, improved general health, increased vigor, conservation of economic resources, and popular appreciation that the government—local, State, and Federal—is doing something for the protection and promotion of the most important interests of the people. Measured in dollars and cents, the investment in this rural health work yields a dividend of about 1,000 per cent. It is not economy to save one dollar and in consequence lose a hundred or a thousand.

Demonstrations in only a little more than 50 of our 2,850 rural counties are too few and too far apart to make the much needed impression upon the situation. The demonstrations have shown the effectiveness and economy of this plan of work. There is no room for reasonable doubt about the need of expansion. The work should now be put on a distinctly cooperative basis. Numerous letters from State health officers to the bureau within recent months present cogent reasons for an enlargement of the program of cooperative rural health work without delay.

Activities Recommended by the Advisory Committee on the Education of Sanitarians and the Future of Public Health in the United States.

The Public Health Service through this division has continued its efforts to increase and improve public health personnel and to provide vocational opportunities for adequately trained personnel under favorable tenure and adequate compensation. The advisory committee, appointed in March, 1922, has been most helpful. This committee held its second meeting on January 3, 1923, at Washington, D. C., and considerable business has been done with the committee through correspondence. Eight members have been added, and the committee as enlarged consists of the following:

David L. Edsall, chairman, dean, school of public health, Harvard University.
C. E. A. Winslow, vice-chairman, professor of public health, Yale University.
A. J. McLaughlin, secretary, surgeon, United States Public Health Service.
A. C. Abbott, director school of hygiene and public health, University of Pennsylvania.

C. C. Bass, dean, college of medicine, Tulane University.
Haven Emerson, professor of public health administration, college of physicians and surgeons, Columbia University.
W. H. Howell, assistant director, school of hygiene and bacteriology, professor of bacteriology, university of Chicago.
William H. Park, professor of bacteriology and hygiene, University and Bellvue Hospital Medical College; director of the bureau of laboratories, department of health, New York City.
W. S. Rankin, secretary, North Carolina State Board of Health.
Wickliffe Rose, president, General Education Board of the Rockefeller Foundation.
M. J. Rosenau, professor of preventive medicine and hygiene, school of public health, Harvard University.
Frederick W. Sears, sanitary supervisor, New York State Department of Health.
John Sundwall, director, division of hygiene and public health, University of Michigan.
C. E. Turner, assistant professor, department of biology and public health, Massachusetts Institute of Technology.
Henry F. Vaughan, commissioner of public health, Detroit.
Victor C. Vaughan, professor emeritus of hygiene and physiological chemistry, medical school, University of Michigan.
William H. Welch, director, school of hygiene and public health, Johns Hopkins University.
Ray Lyman Wilbur, president, Stanford University; president, American Medical Association.
Ennion G. Williams, commissioner, Virginia State Board of Health.
Linsly R. Williams, managing director, National Tuberculosis Association.

Study of tenure and salaries of health officers.—Inquiries were sent to State and city health officers, and considerable data were collected regarding the present status of tenure and salaries. The results of this and other studies indicate that the situation is far from satisfactory. It is evident that uncertainty of tenure is keeping good men out of office, that it tends to prevent the organization of effective programs, and that enforced resignations sometimes cut short the development of well-conceived programs.

The task of providing vocational opportunities under favorable tenure and adequate compensation.—A book has been prepared, with the aid of the advisory committee, for distribution among governors, mayors, and other public officers, setting forth the importance of public-health activities in State and municipal governments and explaining the need for improved conditions.

The recruiting of new personnel.—One of the reasons why more students do not undertake public-health work is insufficient information concerning the nature and opportunities of public-health work. With the assistance of the advisory committee, a pamphlet is being prepared on "Opportunities for a Life Career in Public Health." It is expected that this pamphlet will be published at an early date and be available for distribution to medical students in particular and college students in general.

The training of new personnel.—Letters were sent to 70 medical schools suggesting the grouping of all courses dealing with public health given by these medical schools and other schools of the various universities with which these medical schools are affiliated. Partially as a result, presumably, of the March, 1922, Conference on the Education of Sanitarians and Subsequent Activities of the Service, it appears that a considerable number of universities are taking steps to establish departments, separate curricula, and professorships of public health.

With the assistance of a subcommitte and the approval of the advisory committee the Public Health Service issued a report on

"Courses in the College Curriculum Dealing with Public Health." Copies of this report were sent to 257 presidents, deans, and other officers of colleges and universities who had requested the report and to 402 others.

Upon the recommendation of the advisory committee, steps were taken to establish a "clearing house" which would enable students in public-health schools about to graduate to obtain practical field training. A few such positions were found, but it appeared that at present there are so few students the schools of public health have been able without assistance to find necessary field training.

The training of sanitarians now employed.—At the meeting of the advisory committee on January 3, 1923, it was recommended that the Public Health Service send a letter with an accompanying return post card to sanitarians and physicians to determine the need for a six to eight weeks' public health institute for the training of sanitarians now employed: 20,571 letters were sent out, and 6,123 post cards were returned. Of these 6,123 persons, 5,746 believe that a need exists for the type of institute proposed; 3,008 prefer the summer to other seasons of the year as a time for such institutes, and 4,222 state that they could probably attend an institute if not held too far from their homes. The great majority favor holding institutes in various medical centers rather than at Washington, D. C. The service is inviting four or five universities to establish public-health summer schools to meet the needs of sanitarians and practicing physicians revealed by this inquiry.

Data have been collected indicating that correspondence and reading courses are being conducted by some ten or fifteen State departments of health and universities. The inquiry will be continued for the purpose of determining the effectiveness of these courses.

Control of Interstate Carrier Water Supplies.

As in preceding years, the supervision of water supplies used for drinking, culinary, and ablutionary purposes on cars and vessels of common carriers in interstate traffic has been carried on in cooperation with the State health departments, and the personnel and resources of these agencies have been utilized to the fullest extent possible. Where sanitary engineering divisions did not exist in State departments of health or were inadequate because of lack of appropriations and personnel, the Public Health Service assisted as far as possible in establishing and developing such divisions, both for the marked results which they accomplish in disease prevention and for the assistance which they give in making inspections and analyses of water supplies, including those used by interstate carriers. Such cooperation was extended to 12 State departments of health. During the fiscal year, one State department of health (Utah), established a division of sanitary engineering and another (Maine) reestablished such a division after a lapse of about a year.

The cooperative certification policy as adopted at the Conference of State and Territorial Health Officers on June 4, 1919, and modified on June 4, 1921, has been carried out with greater efficiency and at less expense during the past fiscal year, and has resulted in the improvement of many public water supplies, including those of important cities.

In the first week of January, 1923, the third annual conference of the service engineers in charge of interstate sanitary districts was

held at the bureau with the following results: (1) An arrangement was agreed upon between the Ministry of Health of Canada and the Public Health Service whereby Canadian and American vessels operating on the Great Lakes and St. Lawrence River would have the same kind of supervision over their drinking, cooking, and washing water supplies and systems; (2) as a result of further experience, improved methods of supervision over drinking, cooking, and washing water supplies and systems on vessels operating in interstate traffic were adopted; (3) it was decided to extend the supervision to vessels operating between the United States and Porto Rico, Alaska, Hawaii, and the Virgin Islands. The conference was of value in solving numerous problems which arose in the districts during the year, and it resulted in the development of improved and uniform methods of administration in all of the districts.

Transportation of Water Purification Chemicals.

During the winter, delays in transportation of water purification chemicals to waterworks plants in New England threatened serious consequences, and in one instance resulted in a small outbreak of water-borne disease. The delays were due to heavy snowstorms and freight-car embargoes because of car shortage. Through the cooperation of the Interstate Commerce Commission, relief was secured by having special dispatch orders granted for cars destined to waterworks plants with water-purification chemicals. Through an arrangement with the Interstate Commerce Commission, similar relief will be provided under like circumstances in the future.

Advisory Committee on Official Water Standards.

A committee composed of representatives from Government departments and scientific associations and of eminent sanitarians was appointed in May, 1922, to review the present Treasury Department standard for drinking water on interstate common carriers and to recommend a standard, or standards based on specific methods of laboratory analyses and field surveys to be applicable to all classes of water supplies coming within the jurisdiction of the interstate quarantine regulations of the United States. During the past fiscal year a report has been prepared with a tentative bacteriological standard. Standards for field surveys, and chemicals and physical constituents are under consideration.

Railroad Interstate Water Supplies.

During the past fiscal year, efforts were concentrated on obtaining complete and accurate information as to sources of water supply used by railroads for drinking and culinary purposes on cars. This work has resulted in more effective supervision.

As a result of cooperative efforts between the Public Health Service and the American Railway Association, a report was prepared for adoption by the association as standard procedure in constructing sanitary coach yards. This report should prove valuable in assisting railroad officials in providing sanitary improvements in present yards as well as in those to be constructed in the future. In addition, through similar cooperative efforts, greater improvements have been

made in safeguarding water supplies and in providing sanitary toilets and other equipment at stations, on cars, and the like, with less delay and expense to the common carrier. A gratifying result of this cooperation is the voluntary reference to the Public Health Service, by the railroads, of many matters pertaining to health and sanitation.

Particular attention has been given to the installation of coolers on cars so that the ice will not come in contact with the drinking water. Blueprints showing various types of coolers used by each common carrier have been obtained. Satisfactory coolers in large numbers are being installed by the railroads so that by July 1, 1924, in accordance with a previous arrangement with the American Railway Association, all cars provided with coolers will meet the sanitary requirements.

In explanation of the following table of water sources certified, it is necessary to state that, since the water supplies of the largest cities have been certified and the greatest travel takes place at these cities, the percentage of travelers safeguarded by this supervision is considerably greater than the percentage of water supplies certified.

Railroads—Interstate carrier waters—Certified during fiscal year ended June 30, 1923.

State.	Source.				Certified.			Action pending.	Per cent sources certified.
	Public.	Private.	Railroad.	Total.	Satisfactory.	Polluted.	Provisional.		
Alabama	30	7	4	41	35	0	1	5	88
Arizona	26	9	18	53	10	0	0	43	19
Arkansas	46	14	25	85	0	0	0	85	0
California	52	11	27	90	68	0	0	22	76
Colorado	26	2	10	38	15	1	1	21	45
Connecticut	30	0	1	31	14	0	9	8	74
Delaware	6	1	1	8	4	1	2	1	88
District of Columbia	1	0	0	1	1	0	0	0	100
Florida	47	8	14	69	21	0	0	48	30
Georgia	65	6	4	75	66	1	0	8	90
Idaho	25	3	16	44	18	1	0	25	43
Illinois	67	18	26	111	47	2	4	58	48
Indiana	56	2	21	79	57	6	1	15	81
Iowa	61	8	29	98	43	9	4	42	57
Kansas	77	3	27	107	81	3	1	22	80
Kentucky	27	11	9	47	27	1	1	18	62
Louisiana	35	12	20	67	28	1	0	38	43
Maine	44	17	10	71	0	0	0	71	0
Maryland	12	1	9	22	14	0	1	7	68
Massachusetts	37	0	2	39	31	0	0	8	80
Michigan	68	16	35	119	106	1	0	12	90
Minnesota	49	11	32	92	59	10	0	23	75
Mississippi	35	11	9	55	10	0	0	45	18
Missouri	47	16	26	89	1	0	0	88	1
Montana	22	2	12	36	22	0	0	14	61
Nebraska	37	2	25	64	55	6	0	3	95
Nevada	7	1	11	19	11	0	1	7	63
New Hampshire	18	2	4	24	20	0	1	3	88
New Jersey	48	3	7	58	57	0	0	1	98
New Mexico	13	2	17	32	30	1	0	1	97
New York	102	14	15	131	29	3	6	93	29
North Carolina	51	23	15	89	19	2	5	63	29
North Dakota	13	2	13	28	0	0	0	26	0
Ohio	83	9	18	110	86	8	0	16	85
Oklahoma	53	7	21	81	16	3	3	59	27
Oregon	39	6	11	56	31	0	0	25	55
Pennsylvania	128	24	25	177	92	0	2	83	53
Rhode Island	4	0	4	8	8	0	0	0	100
South Carolina	34	7	4	45	33	0	1	11	76
South Dakota	24	2	14	40	14	5	5	16	60
Tennessee	30	10	19	59	30	4	0	25	58
Texas	103	19	61	183	56	1	4	122	33
Utah	10	7	6	23	8	0	1	14	39
Vermont	14	9	1	24	23	0	0	1	96
Virginia	48	6	8	62	46	0	1	15	76
Washington	39	5	24	68	35	4	0	29	57
West Virginia	29	16	20	65	49	0	1	15	77
Wisconsin	48	18	23	89	0	0	0	89	0
Wyoming	19	1	7	27	15	4	1	7	74
Total	1,985	384	760	3,129	1,541	78	57	1,453	54

VESSEL INTERSTATE WATER SUPPLIES.

The supervision over drinking, cooking, and washing water supplies and systems on vessels operating in interstate traffic has been improved greatly during the past fiscal year.

Through the cooperation of State departments of health, including the Territorial Board of Health of Hawaii, more effective certification of water supplies ashore used aboard the vessels for drinking, culinary, and ablutionary purposes has resulted. The additional cooperation of local health authorities has brought about a regular and frequent check on the purity of such water aboard vessels through bacteriological analyses of samples of the water. Special efforts have been made to obtain accurate, complete, and pertinent data concerning the vessels, vessel companies, and water supplies coming under this supervision. These efforts have resulted in a material increase in the records and in more effective supervision. In addition, general sanitary conditions on the vessels have been inspected, and improvements have been made where necessary, thereby assisting the vessel owners in maintaining a better morale among the crews and in preventing disease outbreaks.

The Steamboat Inspection Service has rendered valuable assistance to the district engineers by furnishing data collected by their inspectors regarding vessel water supply systems.

Special investigations have been made for, and assistance rendered to, the United States Shipping Board, the Coast and Geodetic Survey and the Coast Guard, in safeguarding the water supplies used aboard their vessels for drinking, cooking, and washing purposes. Through the cooperation of shipbuilding companies and naval architects, marked success has been achieved in obtaining safe water-supply systems aboard vessels under construction.

The following table summarizes by States data concerning the certification of vessel interstate carrier waters during the fiscal year ended June 30, 1923. The number of water supplies certified, however, is no indication of the number of travelers who are protected against typhoid fever, dysentery, and other water-borne diseases.

Vessels—Interstate carrier waters—Certified during fiscal year ended June 30, 1923.

State.	Source.				Certified.			Action pending.	Per cent sources certified.
	Public.	Private.	Company.	Total.	Satisfactory.	Polluted.	Provisional.		
Alabama	4	0	1	5	3	0	0	2	60
California	32	2	1	35	0	0	0	35	0
Connecticut	5	0	0	5	4	0	1	0	100
Delaware	2	0	0	2	1	1	0	0	100
District of Columbia	1	0	0	1	1	0	0	0	100
Florida	17	7	0	24	0	0	0	24	0
Georgia	3	0	0	3	0	0	0	3	0
Idaho	1	0	0	1	0	0	0	0	0
Illinois	8	0	0	8	0	0	0	8	0
Indiana	4	1	0	5	4	0	0	1	80
Iowa	1	0	0	1	0	0	0	1	0
Kentucky	5	1	0	6	5	0	0	1	83
Louisiana	4	1	0	5	2	0	0	3	40
Maine	6	0	1	7	0	0	0	7	0
Maryland	2	1	0	3	2	0	0	1	67
Massachusetts	10	0	0	10	4	0	0	6	40
Michigan	14	0	1	15	6	0	0	9	40
Minnesota	3	0	0	3	0	0	0	3	0

Vessels—Interstate carrier waters—Certified during fiscal year ended June 30, 1923—Con.

State.	Source.				Certified.			Action pending.	Per cent sources certified.
	Public.	Private.	Company.	Total.	Satisfactory.	Polluted.	Provisional.		
Mississippi	6	0	0	6	1	0	0	5	17
Missouri	1	4	0	5	0	0	0	5	0
New Jersey	15	0	1	16	11	0	0	5	69
New York	14	0	1	15	6	0	1	8	47
North Carolina	14	0	0	14	1	0	0	13	7
Ohio	10	0	0	10	10	0	0	0	100
Oregon	7	1	0	8	1	0	0	7	13
Pennsylvania	5	1	1	7	3	0	0	4	43
Rhode Island	3	0	0	3	3	0	0	0	100
South Carolina	4	1	0	5	0	0	0	5	0
Tennessee	4	6	0	10	5	0	0	5	50
Texas	4	6	0	10	0	0	0	10	0
Vermont	1	0	0	1	1	0	0	0	100
Virginia	10	2	0	12	1	0	0	11	8
Washington	29	0	0	29	0	0	0	29	0
West Virginia	7	2	0	9	5	0	0	4	56
Wisconsin	4	0	0	4	0	0	0	4	0
Total	260	37	6	303	80	1	2	220	27

In January, 1923, Dr. John A. Amyot, Deputy Minister of Health of Canada, Dr. John W. S. McCullough, health officer, provincial board of health, of Ontario, and Mr. F. A. Dallyn, sanitary engineer, provincial board of health of Ontario, attended a conference at the bureau, to consider protection of the health of passengers and crews on Canadian and United States vessels on the Great Lakes, by adopting similar standards for drinking water supplies and systems for all Great Lakes vessels. It was decided to put the following program into effect at an early date:

(*a*) The adoption by the Ministry of Health of Canada of regulations similar to the interstate quarantine regulations of the United States regarding interstate carrier water supplies and the rules based on them.

(*b*) The certification of shore water supplies in Canada used aboard Great Lakes vessels similar to the procedure now in force in the United States.

(*c*) The inspection of Canadian vessel water systems and United States vessel water systems by Canadian health authorities and United States health authorities according to similar procedure. Upon inspection of Canadian vessels by United States inspectors, the inspection reports and recommendations to be sent to the Ministry of Health, and action to be taken by the Canadian health authorities, and vice versa.

(*d*) The interchange between the Ministry of Health of Canada and the United States Public Health Service of data, records, and certificates for each Great Lakes vessel inspected calling at both Canadian and American ports, so as to have complete information available in each office.

(*e*) The interchange between the Ministry of Health of Canada and the United States Public Health Service of copies of certificates of shore water supplies in each country used for drinking, cooking, and washing purposes aboard Great Lakes vessels calling at both Canadian and American ports.

(*f*) The detail of a representative of the United States Public Health Service for a necessary period to assist the Canadian health authorities in instituting the above procedure.

(*g*) In case of typhoid fever and outbreaks of dysentery among seamen or passengers on Great Lakes vessels, the case reports and reports of investigations to be interchanged between the Ministry of Health of Canada and the United States Public Health Service.

Interstate Sanitary Districts.

The following activities of district engineers of the domestic quarantine division were carried out during the past fiscal year: (1) Supervision over interstate carrier water supplies, including inspection of drinking. cooking, and washing water systems on vessels; (2) assistance to sanitary engineering divisions of State departments of health; and (3) miscellaneous.

District No. 1—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania.

The activities were similar to those of the previous year, but bette results were obtained through familiarity with the conditions and problems. The main divisions of the work were: (1) Supervision of drinking and culinary water supplies on vessels, including the inspections of vessels and investigations of typhoid-fever cases coming from vessels; (2) control of drinking and culinary water supplies used by railroads, including inspections of railroad coach yards and terminals; (3) cooperation with State health departments in obtaining a more uniform and complete certification procedure and improved local supervision of sources of water supply used by interstate carriers, and also the rendering of advice and assistance relative to sanitary engineering matters in special instances; (4) miscellaneous activities in connection with the carrying out of the interstate quarantine regulations; and (5) cooperation in the initiation and maintenance of rodent surveys in seaport cities and assistance in other plague-preventive work. A special report of this latter work is given in another section.

Vessel water-supply supervision.

There were 195 routine vessel inspections made during the year. With a few exceptions practically all of the interstate passenger vessels operating from this district have been inspected since the supervision of vessel water-supply systems was inaugurated. The improvements which have resulted now place these vessels in compliance with the interstate quarantine regulations of the United States. About 75 per cent of the inspections of passenger vessels during the past fiscal year were reinspections to note improvement in the vessels in accordance with previous recommendations. As a consequence of these inspections 60 favorable certificates of inspection have been issued for passenger vessels during the past year.

Ninety-three inspections of freight vessels and water boats engaged in the delivery of water to other vessels were made. A special

effort has been made to induce operators of freight vessels to correct conditions on all of their vessels along the lines suggested at an inspection of some particular vessel of their fleet. The New York City Health Department has taken over the active supervision of such vessels in New York Harbor. At other ports, such as Philadelphia, Pa.; Boston, Mass.; and Portland, Me., the water boats have been very closely supervised and are now in satisfactory condition. Arrangements have been made with the various local health authorities for the periodic collection and bacteriological analysis of water samples from these water boats. A special effort has been made to have the tanks of the water boats disinfected at regular intervals with a solution of calcium hypochlorite.

The cooperation of naval architects and shipbuilding companies has been secured, to the end that new vessels may be equipped with satisfactory drinking and culinary water-supply systems before leaving the yards. These agencies have agreed to submit proposed water-supply systems for vessels to the bureau for approval. This arrangement has already resulted in requests for cooperation in vessels now under construction.

There were 77 typhoid-fever cases reported as occurring on vessels during the past fiscal year; 35 of these occurred on vessels operating in foreign traffic. The increase of 62 cases over the number reported during the fiscal year 1922 is due in part to better reporting arrangements with the marine hospitals and local health departments. Investigations and inspections of the vessels involved were made in connection with 33 of the cases.

On six of the vessels the number of typhoid-fever cases was such as to reach small epidemic proportions. Assistance was rendered in determining the probable source of infection and in carrying out the necessary control measures in five of these outbreaks. Two of the vessels involved were of foreign registry and had obtained water from water boats at the port of Algiers in Algeria. The investigations showed polluted water supplies as the probable source of infection, and the investigation of the sanitary conditions of these water boats has been referred by the bureau to the Department of State for action. The third vessel involved in a small typhoid outbreak was an American oil tank steamer operating to Central and South American ports. The probable source of infection was contamination of the water supply in the after peak tank due to leaky plates. This condition was promptly corrected by the operating company, which had the vessel dry-docked for repairs.

The fourth outbreak was on a Government-owned vessel which had recently been taken over from another Government department. The probable source of infection was a tap in the galley supplying polluted Delaware River water from overboard, but which was mistakenly supposed to be furnishing water from the drinking and culinary tanks. The fifth vessel was a tramp steamer of foreign registry which had departed from American ports before notification of the occurrence of the cases was received. The sixth vessel was a tugboat operating in New York Harbor. There were 4 cases of typhoid fever among the crew of 11 men.

Special investigations were made of the laid-up fleets of the United States Shipping Board located at Hog Island, Pa., and Jonespoint, N. Y., in connection with the occurrence of typhoid fever cases among the crews of two of the vessels.

In each of these fleets there were more than 100 "laid-up" ships, having a total personnel of at least 200 men. Certain of the vessels were maintained either as "spot ships" ready to go to sea at a few hours' notice or as "mother ships" serving as quarters for the men employed in the fleets. These particular vessels had very elaborate systems of taps supplying polluted fresh water from overboard. This water was intended to be used only for ablutionary purposes, but the lack of signs warning against its use for drinking or culinary purposes made possible the use of the overboard water for these purposes. Moreover, overboard water taps were conveniently located in the galleys and pantries of the vessels, while the drinking and culinary water supplies, which alone should be available in these places, were limited in number and difficult of access. As a result of these inspections, recommendations were made to the United States Shipping Board for improving the sanitary conditions in the fleets. A preliminary investigation and recommendations relative to the operation of the water-purification plant at Hog Island Shipyard were made to the United States Shipping Board in connection with the investigation of one of the laid-up fleets.

RAILROAD WATER SUPPLY SUPERVISION.

It has been the practice in the course of field trips to make observations of the methods employed by the railroad companies in supplying the water for drinking and culinary purposes to the coaches and dining cars. Inspections were made of several public supplies used by railroads and which needed certain improvements. Action tending toward the carrying out of these improvements was pursued in conjunction with the State and local health authorities.

Inspections were made of two railroad terminals. An inspection of the Broad Street Terminal of the Pennsylvania Railroad at Philadelphia was made because of complaints as to the methods employed in cleaning through coaches. Conferences were had with a number of officials of the railroad and recommendations for improving conditions were made. A conference was also held with officials of the Lehigh Valley Railroad and the policy of the bureau relative to changing the water-cooler equipment so that the drinking water and ice for cooling would not be in contact was explained.

COOPERATION WITH STATE HEALTH DEPARTMENTS.

Conferences were held at various times during the year with a considerable number of the health officials of the States comprising the district. Matters relative to the certification of water supplies used by common carriers and other sanitary engineering problems were taken up.

At various times during the year efforts were made to secure the appointment of a State sanitary engineer in Maine. Conferences were had on the subject with the State health officer and public health council. Later in the year the district engineer was instrumental in the reestablishment of the division of sanitary engineering, which had previously been discontinued, and in the appointment of the chemist in charge of the division as a collaborating sanitary engineer in the Public Health Service.

In February, 1923, because of numerous cases of an intestinal disorder, an investigation was made of the public water supply at Albany, N. Y., in cooperation with the State and local health officials. As a result of this investigation the city retained a competent waterworks engineer and is proceeding with plans to improve the waterworks plant.

A meeting of Connecticut waterworks officials convened under the auspices of the State health department was attended and the subject of water supplies used by common carriers was discussed with the officials in attendance.

MISCELLANEOUS.

The miscellaneous activities of the district covered a wide range, including investigations of cases of anthrax, expediting shipments of liquid chlorine to water-purification plants, and investigating trade-wastes disposal processes, and the like. Several cases of anthrax which had an important bearing in interstate spread of disease were handled in cooperation with the New York City Health Department. The cooperation of several agencies was required in dealing with these cases.

The New York City Health Department supervised the packing and handling of the hides from which these cases developed in the New York warehouse. The United States Bureau of Animal Industry supervised the loading into railroad cars the shipment under seal and the unloading in Camden of these hides. The New Jersey State Department of Labor supervised the handling and disinfection of the hides at the Camden tannery plant.

An investigation was also made of the alleged importation and subsequent exportation of anthrax-infected shaving brushes.

Considerable time and effort was expended during the winter months in obtaining priority from the railroads and prompt shipment of chemicals, particularly liquid chlorine, for use in water purification plants for certain municipalities, including Bangor, Me.; Lebanon, N. H.; and Albany, N. Y.

Several trade-wastes disposal processes were investigated during the year and reports submitted to the bureau and other interested officials.

Conferences were had with several of the fire insurance underwriters' associations relative to their regulations concerning cross connections between public water supplies and polluted private industrial water supplies. The general attitude of these associations showed that they realize the danger of permitting such connections and that they do not encourage them.

Several meetings of a committee of the New York City Transit Commission on toilet improvements were attended upon request, and suggestions relative to toilet installations in the subway stations were submitted by the district engineer.

A considerable amount of work was performed by the district engineer upon the proposed new Treasury Department standards. The district engineer was secretary of the subcommittee on field survey and prepared the two tentative reports of that subcommittee. Studies relative to the applicability of the proposed bacteriological standard were also made, and a meeting of the subcommittee on appraisal

in Baltimore, Md., was attended, at which the proposed bacteriological standard was considered.

The following tables give summarized information regarding railroad water supply supervision, vessel supervision, and investigations of typhoid fever cases with which the district was concerned.

TABLE I.—*Summary of railroad water supply supervision.*

Inspections:	
Sources of water supply	3
Terminals	2
Major conferences:	
Railroad officials	4
Others (principally health authorities)	24

TABLE II.—*Summary of vessel water supply supervision.*

Inspections:	
First inspections—	
Passenger	22
Freight	40
Reinspections—	
Passenger	80
Freight	53
Certificates issued:	
Temporary—	
Passenger	5
Freight	11
Regular, favorable—	
Passenger	62
Freight	39
Regular, unfavorable	—
Major conferences:	
Shipping officials	53
Others	21
Water analyses made at—	
United States Public Health Service	32
Others	32

TABLE III.—*Summary of typhoid fever cases.*

Number of cases reported by United States marine hospitals or quarantine stations	47
Number of cases reported by local health departments	30
Number of cases in which conditions on vessels were investigated	33
Number of cases involving passengers	14
Number of cases involving crew	59
Number of foreign-owned vessels involved	21
Number of American-owned vessels involved	28
Number of United States Shipping Board vessels involved	5
Number of Government-owned vessels involved	3
Number of cases involving vessels operating in interstate traffic	18
Number of cases involving vessels operating in foreign traffic	35
Number of vessels having more than four cases	6

DISTRICT 2.—DELAWARE, MARYLAND, VIRGINIA, WEST VIRGINIA, NORTH CAROLINA, SOUTH CAROLINA, DISTRICT OF COLUMBIA.

Assistant Sanitary Engineer I. W. Mendelsohn continued in charge of this district during the year. The activities of the district were mainly a continuation of the work of the preceding year, including (1) administrative duties at the bureau; (2) special technical assistance to the sanitary engineering divisions of State departments of health;

(3) supervision over vessels' water supplies and systems; and (4) special work. The administrative work at the bureau was in connection with the prevention of spread of communicable diseases among the States and the District of Columbia and the carrying out of the interstate quarantine regulations of the United States.

TECHNICAL ASSISTANCE TO SANITARY ENGINEERING DIVISIONS OF STATE HEALTH DEPARTMENTS.

During the past fiscal year, as in other years, special service has been rendered the sanitary engineering divisions of State departments of health for the purpose of assisting in their development and improving the defenses against interstate spread of communicable diseases.

Of importance in this connection was the publication of the weekly public health engineering abstracts of technical articles in current literature and of value to sanitary engineers and other health officials. The abstracts are distributed among the sanitary engineers and other officers of the Public Health Service and among libraries, private and Government health organizations, and sanitarians.. They also serve to inform the public of health progress.

The abstracts are of especial value in bringing to sanitary engineers the latest information in condensed form. They have frequently resulted in the early use of new methods in connection with field surveys, laboratory analyses, and general sanitation.

	To Jan. 30, 1921.	To June 30, 1921.	Fiscal year ended— June 30, 1922.	Fiscal year ended— June 30, 1923.
Abstractors' mailing list	82	171	283	405
Magazines available		69	243	260
Number of abstractors	1	7	28	42
Kinds of bulletins examined		28	6	15
Number of bulletins examined		1,278	450	299
Number of issues of abstracts		27	52	53
Number of copies of abstracts		2,505	12,142	17,383
Number of articles abstracted		231	611	743

In addition the district engineer has served as corresponding secretary of the Conference of State Sanitary Engineers and has assisted in the work of the conference, whose chief purpose is the coordination of health activities of the divisions of sanitary engineering of State departments of health.

VESSEL WATER-SUPPLY SUPERVISION.

The activities included inspection of vessel drinking, cooking, and washing water systems, examinations of plans of these systems for vessels under construction, securing analysis of samples of water from vessels, and investigation of typhoid fever cases on vessels.

Due to increase in administrative duties at the bureau and other activities in the district, but 16 per cent of the vessels operating in the district were inspected. However, in the work carried on during the past two fiscal years the principal passenger vessels in the district have been inspected and improvements made so that they comply with the sanitary requirements for a satisfactory drinking, cooking, and washing water system.

Special investigations were made of the drinking, cooking, and washing water systems on several United States Shipping Board vessels with Mr. E. P. Rust, assistant operating manager, and Associate Sanitary Engineer Pincus to determine feasible means for insuring safe water supplies aboard.

When information is received from marine journals that a vessel is under construction, the district engineer communicates with the shipbuilding company and the naval architect in his district and obtains complete plans of the water system. If necessary, conferences are held with the shipbuilding officials, so that sanitary drinking, cooking, and washing water systems are provided. Five new vessels have been thus equipped in this district during the year.

Through the cooperation of the State departments of health of Maryland and Virginia and the city health departments of Baltimore, Norfolk, and Washington, bacteriological analyses were made of samples of water from the drinking, cooking, and washing water systems on vessels operating at those ports. Such analyses were begun by the Baltimore health department in June. The number of examinations made in the past fiscal year were—

Baltimore (June)	10
Norfolk	132
Washington	180

When the analyses showed impure waters, investigations and corrections were made. The reports of analyses are sent regularly to the district engineer, who takes up the matter of necessary improvements with the vessel officials, informing them of the analytical results. It is intended to have monthly reports of analytical results sent to the vessel companies to inform them of the condition of their water supplies.

INVESTIGATION OF TYPHOID FEVER CASES.

On September 14, 1922, a Government vessel on which three typhoid fever cases had occurred was inspected. It was found that 21 cases of gastro-intestinal disorders had also occurred, all due to impure water used aboard for drinking, cooking, and washing purposes. Another vessel of the same Government bureau was also inspected. Recommendations for safeguarding the water supply were carried out immediately.

A passenger vessel at Washington, D. C., on which two typhoid fever cases in the crew had been reported, and two Government vessels, each having a typhoid fever case, were inspected in the fall and recommendations to safeguard the water supplies in accordance with present experience were carried out.

Number of vessel companies affected by the interstate quarantine regulations	65
Number of vessels affected by the interstate quarantine regulations	187
Number of vessels inspected	31
Number of vessels reinspected	4
Number of regular (favorable) certificates issued	14
Number of temporary certificates issued	2
Number of typhoid fever cases reported	8

Inspections were made of certain well known waterworks and sewage-disposal plants in this district to obtain operating data for use by State and Public Health Service sanitary engineers.

DISTRICT 3.—OHIO, INDIANA, ILLINOIS, MICHIGAN, WISCONSIN.

Assistant Sanitary Engineer A. E. Gorman remained in charge of the district. As in former years, the activities were confined largely to exercising supervision and control over water provided for drinking and culinary purposes on interstate vessels and trains.

WATER SUPPLIES ON VESSELS.

The vessels coming under the supervision of this district were those operating in interstate traffic on the Great Lakes and St. Lawrence River.

One of the most important developments in connection with the water supply control work was the making of satisfactory arrangements with the Department of Health of Canada regarding supervision over Canadian owned vessels. At a meeting with Canadian health officials at Ottawa on April 6, 1923, Assistant Sanitary Engineer A. E. Gorman assisted in the drafting of regulations for the Department of Health of Canada concerning the supplying of drinking and culinary water on Canadian vessels. The new regulations will become effective at the opening of navigation on the Great Lakes in 1924.

The supervisory and control work over the drinking and culinary water on American vessels was again carried out on a cooperative basis between Federal, State, and local health authorities, the office of Interstate Sanitary District No. 3 serving as headquarters.

Inspections of water systems on vessels were made by Public Health Service inspectors and all notices or certificates issued as a result of inspection reports were made by the district engineer. The State departments of health supplied information regarding the sources of water obtained at various ports of call for use on vessels and recommended favorable, unfavorable, or provisional, certification. The health departments in six large Great Lakes cities cooperated in the control program by collecting and analyzing weekly or semiweekly samples of water from the various passenger vessels calling at their respective ports. Bacteriological analyses of samples collected were made in accordance with standard methods, and reports on same were returned to the district office weekly. In cases where serious contamination of the drinking water on a vessel was indicated, telegraphic reports were made and prompt corrective measures were secured. Reports, with the results of analyses, were made to the shipping officials monthly.

The shipping interests manifested their interest in and appreciation of the work by prompt and willing compliance with recommendations made. The following table gives the number of samples of water collected from vessels and analyzed at the laboratories of the cooperating health agencies during the year ending June 30, 1923:

Buffalo, N. Y., Department of Health	102
Chicago, Ill., Department of Health	1,246
Chicago, Ill. (United States Marine Hospital No. 5)	638
Cleveland, Ohio, Department of Health	263
Detroit, Mich., Department of Health	608
Milwaukee, Wis., Department of Health	276
Toledo, Ohio, Department of Health	60
Total	3,193

The many dangerous conditions which were found to exist on American passenger and freight vessels two seasons ago have been corrected. When the Great Lakes passenger fleet was put into commission for the 1923 season, none of the vessels carried drinking water stored in tanks formed by the hulls of the vessels. By-passes around treatment apparatus and cross connection between the drinking-water system and other systems aboard had been abolished. Accurate line diagrams have been made showing the drinking-water systems on all vessels inspected.

Because of its favorable location the St. Mary's River Canal at Sault Ste. Marie, Mich., was selected as the station for inspecting freight vessels. An inspector was detailed to this station from June 7 to October 24, 1922. An inspector was also employed at Chicago, Ill., from August 24, 1922, to October 1, 1922, and during the month of June, 1923. In the table at the end of this report the inspection activities are summarized.

The importance of exercising a strict control over drinking and culinary water on Great Lakes vessels may be judged from the number of persons who travel on these boats each year and the potential dangers associated with drinking water from the lakes. It is estimated that between 4,500,000 and 5,000,000 passages are taken on Great Lakes vessels annually. From 25,000 to 30,000 persons are employed on vessels of the fleet. While the Great Lakes water may be fresh, clear, and cool, the seacocks through which it is taken are submerged in grossly polluted harbor water while vessels are at dock at large ports. Furthermore, vessels ply on similar courses and, as sewage is discharged overboard, there is always the chance that the water supply taken on by a vessel, even in midlake, may have been polluted a few hours previous by sewage discharged from another vessel.

Over 80 per cent of upward of 500 American steam vessels and barges in interlake freight service on the Great Lakes are equipped with distillers for supplying drinking water. Others obtain water from shore sources. The following table gives the methods by which drinking and culinary water is supplied passenger-carrying vessels:

4 Vessels.	R. U. V.[1]	Distillation.[2]	Ozone.[3]	Sources ashore.	No water supplied.	Total.
Passenger, regular:						
Inter city	30	2	2	19	0	53
Local excursion	0	0	0	13	5	18
Local ferries	0	0	0	0	12	12
Total	30	2	2	32	17	83
Car ferries:						
Inter city	1	9	0	7	0	17
Local	0	0	0	0	5	5
Total	1	9	0	7	5	22

[1] Filtration and ultra violet ray disinfection.
[2] Distillation.
[3] Filtration and ozone disinfection.

During the year 25 cases of typhoid fever, with 7 deaths, were reported among seamen of the Great Lakes fleet from various United States marine hospitals and Public Health Service relief stations in

this district. Seventeen were for the season of 1922 and 8 for 1923 to July 1. It is probable that none of these cases were due to infected drinking water aboard the vessel. In two instances more than one case was reported from a single vessel, there being two cases on the steamship *J. L. Reiss* and three on steamship *E. A. S. Clarke*. The sources of these infections were not determined, although careful investigations were made. On both ships the distillers had been operated continuously during the time of probable infection and inspectors found no evidence which pointed to the drinking water as the cause. The cases reported during the year were from the following class of vessels:

Type vessel.	Water supply—	Cases.	Deaths.
Freighter	Distilled	18	3
Freighter	Sources ashore	1	0
Barge	Distilled	1	1
Barge	Sources ashore	1	1
Passenger	Distilled	1	0
Passenger	R. U. V.[1]	2	1
Scow derrick	Sources ashore	1	0
		25	6

[1] Filtration and disinfection by ultra violet ray.

The following table summarizes the typhoid fever cases among Great Lakes seamen hospitalized at United States marine hospitals since 1915.

Navigation season:	Cases.	Navigation season:	Cases.
1915	60	1919	24
1916	70	1920	20
1917	49	1921	13
1918	39	1922	17

The following table summarizes the activities in this district with reference to vessel water supply control work for the year ended June 30, 1923, which, of course, overlaps into two navigating seasons:

Activity.	Passenger.	Freight.	Total.
Inspections:			
First	83	276	359
Reinspections	51	75	126
Docks	25	1	26
Certificates passed:			
Temporary	61	355	416
Regular favorable	0	0	0
Regular unfavorable	0	0	0
Major conferences:			
Shipping officials			42
Others			
Water analysis made by:			
United States Public Health Service			638
City health departments			2,555

WATER SUPPLIES ON TRAINS.

During the winter and spring months attention was given to the conditions under which drinking water was being supplied on trains operating in interstate traffic. Efforts were directed along two lines: (1) Improvements in the methods of handling drinking water in delivery to coolers in coach yards and railway terminals to eliminate

unnecessary contamination, and (2) improvements in the design of water systems on cars, especially the standard drinking-water coolers used on various lines.

On November 23, 1922, Assistant Sanitary Engineer A. E. Gorman represented the bureau at the meetings of the joint committee on drinking water supplies of the American Railway Association and the American Railway Engineering Association in Chicago, and assisted in the work of the subcommittees. At these meetings special attention was given to yard construction and general sanitation. A sanitary survey of the 12 railway coach yards in Chicago was made during the week of March 26, 1923, in company with an engineer from the Illinois Department of Health. On December 1, 1922, several chief surgeons of railroads having headquarters in Chicago were accompanied on an inspection of coach yards in that city, at which time insanitary conditions were pointed out and recommendations for improvements were elucidated.

During the year, 381 samples of water from drinking-water coolers on trains arriving at, and departing from, terminals in Chicago were collected and analyzed at United States Marine Hospital No. 5. In connection with this work, the various types of water coolers used on trains of different railroads were studied. Unsatisfactory features in connection with the design of standard water coolers adopted by various railroads have been explained to proper officials, with the result that in replacing this equipment the needed improvements are being made. Manufacturers of drinking-water coolers for railroad cars have been advised of the type of coolers which have given best results and have been encouraged in their efforts to redesign unsatisfactory types of coolers. The following table summarizes the activities in this district in connection with railroad water supplies for the year ended June 30, 1923:

Inspections:		Major conferences:	
Sources of supply for water	0	Railroad officials	11
Coach yards	19	Others	8
Terminals	2	Water analyses made	381

MISCELLANEOUS.

During the year Assistant Sanitary Engineer A. E. Gorman spent considerable time in making an investigation of the water-supply system and deep well at the United States Veterans' Hospital No. 76, Broadview, Ill. A report on same with recommendations was submitted to the Director of the Veterans' Bureau in May, 1923.

DISTRICT 4A.—KENTUCKY, TENNESSEE, FLORIDA, MISSISSIPPI, ALABAMA, GEORGIA.

Association Sanitary Engineer H. H. Wagenhals remained in charge of this district until May 31, 1923, when the district office was closed due to lack of appropriation.

VESSEL WATER SUPPLIES.

The main activity of the district office centered around the water supplies and water-supply systems on vessels engaged in interstate traffic.

During the first six months of the fiscal year supervision was maintained over practically all vessels engaged in interstate traffic, regardless of their size or service. In January, 1923, it was decided to temporarily relinquish active supervision over the tug boats, small freighters, etc., on which the personnel affected was relatively small.

It was found, however, that a number of tug boats in this district act as waterboats from time to time in addition to their regular activities. There is comparatively little of this work to be done in this district, so the operation of the vessels for this service alone is, except in very rare instances, not found to be very profitable. In the entire district there are only three vessels engaged strictly in this work, and one of these is out of commission the greater part of the time.

The following table gives the summary of the activities in relation to water-supply systems on vessels:

Number of vessel companies under supervision	45
Number of vessels under supervision	77
Inspections:	
Vessels inspected	62
Vessels reinspected	4
Certificates issued:	
Regular, favorable	9
Certificates issued—Continued.	
Regular, unfavorable	0
Temporary	20
Major conferences:	
Shipping officials	24
Others	14
Water analyses by local laboratories	47

In the above table inspections and certificates are listed even though covering vessels over which supervision is no longer being exercised. All vessel work was discontinued in March, 1923.

The principal corrections required on vessels of this district are: (1) separation of ice used for cooling from the drinking water, and (2) discontinuance of use of common drinking cup. Less frequently corrections are required to eliminate interconnections between the drinking-water supply and other supplies, to provide a special hose for the use of drinking water only, and to protect intake pipes on the vessel from contamination.

RAILROAD WATER SUPPLIES.

Assistance was rendered to the State Board of Health of Georgia in securing improvements in several water supplies used by railroads in interstate traffic. The supplies selected for inspection were those in which difficulty was being experienced by the State engineer in securing necessary improvements. In several instances it is believed that this cooperation was helpful in securing proper action by local authorities.

While engaged in vessel-inspection work in Florida, inspections were made, at the request of the State sanitary engineer, of a number of water supplies in that State. Reports of these inspections were submitted to the State board of health.

In July, 1922, a special investigation was made in cooperation with the State sanitary engineer of Kentucky, of the water supply at Princeton, Ky. Report of this investigation was submitted to the Bureau and the State.

In all, nine water supplies, one coach yard, and one terminal installation were inspected before March, 1923.

MISCELLANEOUS.

Detailed plans and drawings for improvements in the sewage-treatment plant at the United States Veterans' Bureau Hospital No. 48, Atlanta, Ga., were prepared and submitted to the medical officer in charge. In addition, advice was given in connection with the extension of the sewerage system of this institution.

Inspection was made and a report submitted covering sanitary conditions at a spring used for drinking water at the Lincoln Memorial, Hodgenville, Ky.

Advice was rendered to the chemist in charge of the Atlanta, Ga., sewage-treatment plants in connection with rearranging the routine of his laboratory, and instructions were given in certain methods of sewage analysis.

At the request of the State sanitary engineer of Florida, the district engineer attended and presented a paper at a meeting of the Florida Anti-Mosquito Association.

With the reduction in vessel-inspection work, attention was turned toward the development of a program of activities for district engineers in cooperation with State sanitary engineers and along investigational lines. Conferences were held with State sanitary engineers to ascertain what lines of activity might be of value to them.

Tentative programs were being developed for studies involving protection and distribution of milk, control of swimming pools, maintenance of automobile camps, and the study of sporadic cases of typhoid fever and other intestinal diseases.

It was the practice of the office to supply State engineers with information concerning any new developments in engineering which came to the attention of the district engineer, and, where possible, to furnish literature.

Advice was given the chemist in charge of the Atlanta sewage-treatment plants in the matter of undertaking stream-pollution investigations in the Chattahoochee River to determine the future policy of sewage treatment in Atlanta. Through the district office, this matter was referred to the Public Health Service stream-pollution office at Cincinnati, Ohio, and developments were pending at the time the office was closed.

For almost two months in the spring the district engineer assisted in making sanitary surveys of coal-mine communities for the United States Coal Commission.

DISTRICT 5.—MISSOURI, IOWA, NEBRASKA, MINNESOTA, NORTH DAKOTA, SOUTH DAKOTA, AND KANSAS AND MISSISSIPPI AND OHIO RIVER PORTS.

Assistant Sanitary Engineer Joel I. Connolly continued in charge of this district.

This district was formerly known as interstate sanitary district No. 6, but was termed "No. 5" in October, 1922. The activities may be divided into four principal classes: (1) Supervision over water supplies on vessels; (2) supervision over water supplies on trains; (3) cooperation with the State health departments; and (4) special investigations, inspections, reports, and abstracts of published articles on sanitary engineering subjects.

WATER SUPPLIES ON VESSELS.

On July 1, 1922, a rearrangement of the supervision of water supplies on river vessels was made, to include the supervision of those on the Mississippi River system under this district. To do this the files for vessels around Pittsburgh, Pa., were transferred from district No. 1; those for vessels on the West Virginia tributaries of the Ohio River from district No. 2; those for vessels on the Ohio River below Pittsburgh, Pa., and on its northern tributaries from district No. 3; those for vessels on the Tennessee, Cumberland, and other rivers south of and tributary to the Ohio River from district No. 4–A, formerly known as No. 4; and those for vessels on the lower Mississippi and its tributaries south of the mouth of the Ohio River from district No. 4–B, formerly No. 5. The change was made for the reason that the river vessels are of a distinct type and because of their shallow draft involve problems not encountered with Great Lakes and coastwise vessels. Furthermore, under the old arrangements the movements of these vessels from point to point in the vast Mississippi River area brought them under the supervision of different districts and resulted in duplication of work.

As the river water is fresh, it has been a time-honored practice for members of the crew to reach over the low guards with a tin can nailed to a stick or on the end of a cord and thereby secure drinking water which is grossly polluted. Several distinct water systems are used on many of the vessels, as the necessity for keeping the draft as light as possible does not enable them to carry sufficiently large quantities of pure water to last through a long trip. Thus, some river vessels have four different water systems—a pure water system carrying drinking water from city supplies or water that is distilled or otherwise purified aboard; a hot-water system carrying boiled but turbid water from the boilers, suitable for dishwashing, but unfitted for drinking purposes on account of its appearance; an ablutionary water system carrying river water which has been filtered through porous stone or pressure sand filters, thus rendering it clear but unsafe to drink; and a raw-water system supplying river water for feeding boilers, flushing decks, and fighting fires.

While many companies owning vessels have cooperated in a gratifying way, some have not, and even when the managing officials of a company desire to have the equipment in accordance with the sanitary requirements of the interstate quarantine regulations, an unscrupulous employee may install a cross connection between the various water systems in some out of the way corner. These cross-connections would result in heavily polluted river water, very likely taken aboard while the vessel is lying at the bank immediately over the outlets of city sewers, being furnished to large numbers of people. Two such concealed cross-connections were found during the year on a large excursion steamer on which drinking water is furnished to more than two hundred thousand persons annually in travelling from St. Paul, Minn., to New Orleans, La. The inspection of such a vessel entails a great deal of work if care is taken to see that no cross-connections exist. Experience has shown that reliance can not be placed in incomplete inspections.

The aversion of river men to city water supplies appears at first inexplicable, but there is evidence to show that those who have

been in the habit of drinking raw river water over long periods of time suffer from constipation when they drink pure city water instead.

Owing to the large number of ports at which vessels must be inspected, a great deal of travel is required. Due regard for economy has dictated the policy pursued during the past year of inspecting as many vessels as possible whenever at a port and of holding conferences in person with the managing officials of the companies at the time, advising them of the findings and making recommendations regarding improvements. In cases where it is deemed necessary, noncompliance notices are left with the responsible officials, setting a definite time when the improvements should be completed. The character of the violations and the improvements recommended are stated on the notices.

The duties of this district have required travel to points in 18 States, namely, Alabama, Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, Ohio, Pennsylvania, Tennessee, Texas, West Virginia, and Wisconsin. The reports of the Steamboat Inspection Service of the Department of Commerce have been of very great assistance in giving information of vessels concerning which little or nothing was known.

The number of vessels within the supervision of this district was greatly increased at the beginning of the fiscal year by transfer from other districts and has continued to grow. The district records now contain the names of more than 860 vessels and the names of 520 vessel owners to whom information relative to the interstate quarantine regulations has been sent and from whom information regarding sources of water supply, number of passengers and crew, and the like, has been required. More than 130 of these are passenger vessels which carry water for drinking purposes at present, and the rest are freight vessels and towboats. Some of the towboats present more of a public health problem than some passenger vessels, as the latter may be passenger ferries having such short runs that it is unnecessary to furnish drinking water to the passengers, while the crews of the large towboats have a very high labor turnover, and they all use drinking water aboard. These towboats frequently serve as slow passenger vessels, where the passengers, wishing to get up or down the river, work as the crew to obtain passage and leave the vessel when they reach their destinations.

The use of river water for drinking purposes is more serious and more likely to lead to epidemics elsewhere when indulged in by these transient members of the crew of a towboat than when used by the regular river men. The latter are more liable to be immune to water-borne diseases, and are not so apt to leave the vessel and get a job in a dairy or a similar place, from which the infection acquired while on the boat may spread to large numbers. The number of passenger vessels requiring supervision has been materially reduced by having vessels making short trips discontinue furnishing water for drinking purposes. In many cases the water was dipped directly out of the river and kept in a keg with ice. More than 100 vessels have discontinued this dangerous practice by allowing their passengers to wait until the completion of the trip to get their drinking water. The discontinuance of drinking water on many of the vessels is an advantage to all concerned, since it protects the health

of the public by preventing the use of untreated river water, it saves the operator the trouble and expense involved in providing a good supply of adequate amount, and gives him a good reason for not providing it if passengers should inquire, and it saves the Government the expense required by the time and travel which annual inspections would involve.

The task of having extensions of pipe lines made down the river banks at cities where good public water supplies are available has been pursued until now vessels may go from New Orleans to Pittsburgh without ever being very far from a source of drinking water which is convenient and which may be handled in a sanitary manner through short sections of hose kept especially for this purpose. The largest installations made by the cities during the past year were at Memphis, Tenn., and Pittsburgh, Pa. At the former three pipe lines were laid by the city in November, 1922, to the wharf boats of the three principal companies at a cost of $1,300. Each line was equipped with several flush hydrants at different levels for use at various stages of the river. At Pittsburgh a single pipe line which will serve four vessel companies was built in March, 1923.

It was desired to have the pipe lines built by the city wherever possible, so that water could be obtained by all on equal terms. Where the city could not be prevailed upon to build the line, the companies desiring to use the water have built them; and if other vessels than their own wish to take water from their lines, a fee is charged. This latter arrangement is obviously less desirable from a public-health viewpoint than one where pure water may be easily obtained simply for the cost of the water. Up to July 1, 1923, pipe lines have been built at the following cities: On the Mississippi River, in order, going north:

New Orleans, La.	Greenville, Miss.	St. Louis, Mo.
Baton Rouge, La.	Memphis, Tenn.	St. Paul, Minn.
Vicksburg, Miss.		

and on the Ohio River, in order, going east:

Paducah, Ky.	Jeffersonville, Ind.	Gallipolis, Ohio.
Evansville, Ind.	Cincinnati, Ohio.	Parkersburg, W. Va.
Rockport, Ind.	Portsmouth, Ohio.	Pittsburgh, Pa.

and at Bowling Green, Ky., on the Green River; at Nashville, Tenn., on the Cumberland River; and at Morgan City, La., on Grand Lake, which is connected by a canal with the Mississippi River, so that packets may run between Morgan City and New Orleans.

The concentration of pipe lines along the Ohio River and the Mississippi River south of St. Louis is due to the relatively greater density of river traffic in these sections. There are only a few vessels taking water from sources ashore for drinking and culinary purposes and operating on the upper Mississippi which do not come into St. Louis regularly at the present time; and until a greater need arises for pipe lines in this section, it has seemed wise to concentrate on the busier portions of the river. Efforts have been made to have the city build pipe lines for the use of the vessels at Cairo, Ill.; Madison, Ind.; and Wheeling, W. Va. A promise has been obtained from the latter for construction of a pipe line for vessels at some time in the future in connection with other waterworks improvements under way, and the prospect at Madison is fair; but at Cairo the close

proximity of the pipe line at Paducah, Ky., where most of the vessels passing Cairo stop, makes the construction of a line by that city very doubtful. However, at this point a pipe line would be more of a convenience than a necessity.

For convenience in noting the relative location of the cities where pipe line installations have been made, a map has been prepared, showing these cities by small round dots, which disclose at a glance the relative distances that a steamer, depending for water upon supplies ashore, would have to carry water between the "sanitary filling stations." If a shortage should be experienced before reaching a city where a pipe line is available, water can be taken aboard by the old-fashioned insanitary method of carrying it in milk cans or buckets; but studies of analyses made of samples of water so handled have shown it to be subject to serious potential pollution, so efforts are made to see that vessels are equipped with tanks large enough to hold a plentiful supply of water to last between cities having pipe lines.

fforts to secure and continue the cooperation of city and State health departments in the collection and examination of samples of drinking water from vessels have been made constantly, and the aid thereby secured has been very valuable and effective. It has made possible a prompt checking of careless and insanitary practices in many cases, and has led to the discovery of defects in supposedly satisfactory systems that might otherwise have gone unnoticed for a long time. An example which has just occurred is valuable in showing these possibilities. A bad report on a sample collected from the distilled-water system of an important excursion vessel, which carries large numbers of people daily, led to an immediate investigation, which showed that the chief engineer of the vessel had broken the water still while he was intoxicated, permitting raw river water to pass through it untreated and to reach the drinking-water taps and soda fountain. The offending employee was dismissed and the still was promptly repaired. This correction might have been delayed for months and almost certainly would have been for weeks—long enough to infect thousands of excursionists—except for the inspection work.

The State health departments have assisted in many cases, usually by the examination of samples especially collected, while some of the cities examine samples collected at regular weekly or semiweekly intervals. The State Department of Health of Louisiana has had samples examined by the New Orleans city laboratory for this district; the Mississippi State Health Department has examined samples from vessels at Natchez, Miss.; the Tennessee State Board of Health has done the same at Nashville, Tenn.; and the State Board of Health of Kentucky has examined samples at Frankfort from vessels at Owensboro and Paducah, Ky.; the Minnesota State Board of Health has examined samples from boats at St. Paul and Winona, Minn.; and that of West Virginia samples from vessels at Charleston. In addition examinations of samples have been made and reported to this district by the following 11 cities, situated in 9 States:

Cairo, Ill.	Louisville, Ky.	Omaha, Nebr.
Cape Girardeau, Mo.	Memphis, Tenn.	St. Louis, Mo.
Cincinnati, Ohio.	Paducah, Ky.	Wheeling, W. Va.
Evansville, Ind.	Pittsburgh, Pa.	

Not all of these cities have examined samples as a routine measure, and no attempt has been made to indicate the numbers reported by each. The total number of samples from vessel water supplied, collected, examined, and reported during the year is 611.

The reporting of cases of typhoid fever admitted to United States marine hospitals from river vessels has been carried out throughout the year, and in all cases the reports have been followed up either by personal investigation or, where the distance to the vessel was too great, by correspondence with the owners. The medical officer in charge of the United States marine hospital at Paducah, Ky., states that in the past a large proportion of cases at that hospital had stomach and intestinal trouble, exclusive of the typhoid fever cases, and that lately the proportion of such gastrointestinal disturbances has decreased to about one-half of its former size, due presumably to the work which has been done to improve the water supplies on the vessels, since other conditions have remained substantially the same as before.

The cases of typhoid fever among crews on various types of vessels which have been reported to this office by marine hospitals during the fiscal year are shown by the following table. Passengers are not admitted to these hospitals, so they are not included.

Typhoid fever cases from river vessels.

Type.	Period.	
	July–December, 1922.	January–June, 1923.
Common carriers:		
Passenger vessels	3	1
Freight vessels	0	0
Towboats	1	1
Water boats	0	1
Government vessels:		
Engineer Corps vessels	4	0
Mississippi-Warrior Service	2	2
Total	10	5

During the past year it has been the policy of this district to bring the requirements of the interstate quarantine regulations regarding the examination of food handlers to the attention of the shipping officials and to seek to have them observed.

A number of vessels of the Engineer Corps of the War Department were inspected in company with their district engineers and suggestions were made in regard to improvements. This work has been carried out at St. Louis, Mo.; Rock Island, Ill.; Cincinnati, Ohio; Chattanooga, Nashville, and Memphis, Tenn.; Vicksburg, Miss.; Dubuque, Iowa; and New Orleans, La. Many of these vessels have been equipped with distillers or condensers for supplying water for drinking and culinary purposes as a result of these activities, and it is hoped that all vessels having steam will be so equipped before long.

An increasing number of river vessels are being equipped with water stills or condensers for providing drinking water, and a few have experimented with other methods of purification of river water. The following table shows the number of carriers reporting such improvements to date, exclusive of the Government vessels mentioned above.:

Common carriers equipped with purification apparatus.

Vessels with water stills or condensers	59
Vessels with electrically operated ozonizers	2
Total	61

A number of tests and experiments have been made with the ozonizers on the two excursion vessels. As a result, certain recommended improvements have been made, which appear to have resulted in the production of a satisfactory water by this type of apparatus.

Vessel water-supply supervision.

Inspection of vessels:	
First inspections	159
Reinspections	392
Inspections of docks:	
First inspections	9
Reinspections	60
Conferences:	
Shipping officials	404
Health officials	101
Other officials	59
Typhoid fever cases	15
Noncompliance notices issued	54
Certificates prepared:	
Regular, favorable	14
Regular, unfavorable	3

WATER SUPPLIES ON TRAINS.

The activities of this district in regard to water supplies on trains have dealt mostly with sanitary handling of water in placing it aboard trains. Inspections were made of coach yards and terminals at St. Louis and Kansas City, Mo., the principal railroad centers of this district, followed by conferences with the railroad officials having charge, at which recommendations for improvements were made. Progress in these matters has been made in the two cities mentioned, and the work will soon be extended to other railroad centers in this district.

Inspections of 14 public or railroad water supplies have been made during the fiscal year, some in connection with the certification of the water supplies for use by common carriers and others as a matter of information, the State having taken care of the certification.

Railroad water-supply supervision.

Coach yards:	
Inspections	16
Conferences	19
Water supplies inspected	14

OTHER ACTIVITIES.

At the request of the medical officer in charge of United States Veterans' Hospital No. 35, assistance was given in making surveys of mosquito-breeding places within the zone of flight around the hospital in company with one of the medical officers, and in getting the city of St. Louis to take the steps necessary to remove the breeding places through drainage, repair of leaks in water mains, weed cutting, and oiling.

A lecture by radio from Station KSD., St. Louis, Mo., on the pollution of the River Des Peres in St. Louis was given for the State sanitary engineer of Missouri, to assist the city in explaining the necessity for a bond issue of $11,000,000 for building an intercepting sewer

along its banks and straightening its channel to prevent overflows of polluted water within the city. The bond issue was passed and the work is now under way.

An investigation of the Hoover alum process as used at Kansas City, Mo., was made and reported upon.

ASSISTANCE TO MISSOURI STATE BOARD OF HEALTH.

From July 1, 1922, to January, 1923, Associate Sanitary Engineer A. F. Allen was detailed to assist the Missouri State Board of Health in the conduct of sanitary engineering activities.

Data regarding public water supplies and sewerage systems were collected and compiled. In collaborating with the State sanitary engineer, investigations were made of 55 water supplies, as noted in the following table:

Drinking water supplies in Missouri.

	Total listed.		Inspected.	
	Used by railroads under interstate quarantine regulations.	Total in the State.	Used by railroads under interstate quarantine regulations.	Total in the State.
Corporate or municipal ownership in public use	38	154	22	52
Corporate ownership not used publicly but under interstate quarantine regulations	28	28	3	3
Totals	66	182	25	55

Per cent of total supplies used by railroads	36.3
Per cent of total supplies inspected	30.2
Per cent of total supplies used by railroads inspected	37.9

Of these supplies, 22 were inspected by the service sanitary engineer. Invariably recommendations accompanying reports of inspections of water supplies called for the installation of disinfection apparatus or the use of a sufficient amount of chlorine, with bacterial and chemical control of the effectiveness of the amount used. The reports submitted gave usually only advice as to means to secure as quickly as possible the maximum health protection and did not concern the larger problem of economical design and operation. Many of these plants should be completely rebuilt, and the study, advice, and approval of a State sanitary engineer is needed. At present only 7 of the 22 make an attempt to disinfect the water: in other words, two-thirds of them carry no sanitary insurance. It may be added that five of the seven using chlorination made some attempt to control the amount of chlorine used, but in general an insufficient amount was used.

Over half of the plants inspected required one or more reinspection visits, either for the purpose of collecting more samples or to present personally to the authorities the recommendations for improvements and urge their adoption. One inspection was made of a proposed water-supply installation, a report was prepared, and a mass meeting was addressed, urging the passage of bonds to provide the contemplated construction.

Of the seven plants inspected where chlorine was added to the water, five made some attempt to control the amount used in accordance with the recommendations. There were at the close of the period two other supplies that had completed changes of plant or operations which would probably have permitted certification of these supplies. Two more plants were carrying out physical reconstructions. Bond issues were pending or held up by legal interference in three other places.

A special investigation was made of the Kansas City water supply in conjunction with the State sanitary engineer and a report presented with detailed recommendations.

Two sewage-disposal plants were investigated following complaints. A record was made of the sewerage conditions in each place as a basis for future information. Two proposed sewerage installations were also investigated and the municipal authorities advised of the sanitary features. Inspections were also made of privies and wells at certain country schools and assistance was rendered in securing sanitary improvements.

DISTRICTS 6 AND 7.—ARIZONA, CALIFORNIA, COLORADO, IDAHO, MONTANA, NEW MEXICO, NEVADA, OREGON, WASHINGTON, WYOMING, UTAH.

Sanitary Engineer H. B. Hommon was in charge of the two districts, assisted by Assistant Sanitary Engineers L. D. Mars, and A. P. Miller. Sanitary Inspector Carl Benson was on duty in Yosemite National Park until August 26, when he resigned to enter the University of California. The work carried out during the year was divided as follows: Cooperation with the States of the two districts in the examination of water supplies used on trains and vessels engaged in interstate traffic and in the investigations of special problems of sanitation; cooperation with the National Park Service in improving sanitation of the national parks; examination of water-supply systems on vessels engaged in interstate traffic; and special investigations and miscellaneous activities.

COOPERATION WITH STATE DEPARTMENTS OF HEALTH.

The time devoted to work in the States and all other activities excepting sanitation in the national parks was between October 1 and June 10. During this period a survey was made of 18 water supplies in Nevada used on trains engaged in interstate traffic; and in Colorado examinations were made of 12 city and private supplies used by railroads. In Wyoming six supplies were investigated, and in California five. A State sanitary engineer was appointed in Utah during the year and assistance was given him in regard to the cooperative procedure established between the Public Health Service and State departments of health in the certification of water supplies used on trains and vessels engaged in interstate traffic.

Special investigations were made of the water supplies used by the cities of San Francisco and Los Angeles, and through cooperation with the State and city health officials and the citizens the water supplies of these two cities were improved and sterilization was adopted as standard practice.

An investigation was made of the pollution of the North Platte and Laramie Rivers by wastes from oil refineries, and a complete report was prepared outlining measures for relieving the pollution.

Special articles on the "Supervision of water supplies" and the "Disposal of sewage and industrial wastes" were prepared at the request of the State health officers of Colorado, Wyoming, and Nevada for use in their annual reports.

EXAMINATION OF WATER-SUPPLY SYSTEMS ON VESSELS ENGAGED IN INTERSTATE TRAFFIC.

Vessel water-supply systems were examined mainly between October 1 and June 10. On account of the distance between the ports on the Pacific coast and the limited number of interstate vessels in the ports at any given time, it was not possible to cover a large part of the vessels that were to be inspected. There are 362 vessels registered in the Pacific coast ports that should be inspected. The following table gives a resumé of the work done:

Class of vessel.	First inspections.	Reinspections.	Total inspections.	Favorable certificates issued.
Passenger	47	34	81	25
Freight	36	11	47	43
Total	83	45	128	68

In addition to the work outlined above, numerous conferences were held with vessel officials, naval architects, and inspectors of the Steamboat Inspection Service.

A special report was prepared on the Gonsouland car toilet device. This device was designed for the purpose of holding the wastes from toilets on Pullman cars and passenger coaches while passing through stations or over watersheds of public water supplies and while cars are parked in depots.

Special studies were made to develop practical designs for garbage-disposal plants, grease-traps for hotels and other eating places, and privy buildings for use with earth vaults in the public automobile camps.

SANITATION AND MEDICAL ASSISTANCE IN THE NATIONAL PARKS.

The assistance rendered the National Park Service at the request of the Secretary of the Interior in providing the necessary medical attention and improving the sanitary conditions in the national parks was continued during the past fiscal year under the direction of Sanitary Engineer H. B. Hommon. Assistant Sanitary Engineer L. D. Mars and Assistant Sanitary Engineer A. P. Miller were also detailed for duty in the parks. Acting Assistant Surgeon W. E. Crawbuck continued on duty at the Yellowstone National Park until August, 1922. In November, 1922, Assistant Surgeon Harry Schnuck continued on duty at the Grand Canyon National Park until February, 1923.

The season for practically all of the parks is from early June to the latter part of September, and during this short season it is possible

to carry on construction work in a limited number of parks. The activities carried out in the various parks were as follows:

Yellowstone.—Two complete sewerage systems and treatment plants consisting of tank treatment and sterilization, were installed at the Upper Geyser Basin. Plans were prepared for sewerage systems and treatment plants for the Lake Junction and the canyon, and construction work was started in June of this year under the general supervision of a Public Health Service sanitary engineer.

A complete survey was made of all of the water supplies in the park used for domestic purposes, and the dairies and other places handling and selling foods were inspected.

An intensive campaign was started to eradicate mosquitoes from the park. This work was conducted at all of the main junctions this spring, and the results have been so favorable that it is believed that next spring drainage and oiling can be extended so as to practically eradicate the mosquito nuisance.

Special reports were prepared on general sanitation of the park with particular reference to garbage and rubbish disposal and the supervision over sanitary conditions in the public automobile camping grounds.

Through the splendid cooperation of the superintendent of the park in carrying out the recommendations of the Public Health Service sanitary engineers, the sanitary conditions in Yellowstone have been brought to a high standard.

Yosemite.—The work in this park consisted of inspections of the sanitary conditions in the kitchens, dining rooms, storehouses, bakeries, soft-drink parlors, and other places handling or selling food and milk and soft drinks; advising the engineer of the park in regard to the operation of the sewage-treatment plant and the supervision of the two swimming pools; reporting on the general sanitary condition of the park; and making surveys and bacteriological analyses of all the water and milk supplies used in the park.

The superintendent of this park, as well as those of all of the other parks visited, are giving hearty support to the work which the Public Health Service sanitary enginners are carrying out, and the problem of the future is to maintain the high degree of sanitation that is being developed throughout the park system.

Mount Rainier.—The only work done in this park during the year by Public Health Service sanitary engineers was a general survey of the sanitary conditions of the automobile camping grounds and the places handling and selling food, milk, and other food products.

Crater Lake.—A sewerage system and treatment plant was designed for this park, and a general inspection was made of the public automobile camping grounds and the hotel kitchen and dining room.

Sequoia.—Plans and estimates were prepared for a new water supply system, and it is being installed under the general supervision of the Public Health Service sanitary engineers. Plans and estimates were also prepared for a sewerage system and method for disposing of the sewage. There is no level area of ground of sufficient size to accommodate filter beds and no creeks with sufficient flowing water to carry a sterilized effluent without causing a nuisance. It was necessary, therefore, to select an exposed hillside with suitable soil and enough area to take care of the settled effluent by broad irrigation.

Reports on the general sanitation of the park were prepared similar to those referred to under the discussion of other parks. This park has had a large increase in visitors in the last two seasons and the problems of sanitation have been very serious. The park service has been thoroughly alive to the situation, and money has been made available to bring the sanitary conditions up to the standard of the other parks.

General Grant.—Complete plans and estimates were prepared for a new water-supply system and a sewerage system and treatment plant. Money was appropriated to carry out this work, and construction is now proceeding under the general supervision of the Public Health Service sanitary engineers. This park, like Sequoia, is located high in the mountains, where level ground in sufficient area to filter the sewage is not available. It was necessary, therefore, to adopt the same expedient as already described for Sequoia, that is, broad irrigation, using hillsides with vegetation and suitable soil. The sewage will be settled in an ordinary plain settling tank and the effluent applied to the gradually sloping hillsides by means of small orifices in iron pipe. There is practically no rain during the park season, and it believed that the soil and vegetation will take up all the sewage before it gets 50 feet from the discharge lines. One section of a hillside will be dosed only one day a week.

Rocky Mountain.—Estimates were prepared for the cost of eradicating mosquitoes in one section of the park, and this spring a Public Health Service sanitary engineer visited the park and started the work. Special reports were also prepared for the superintendent on sanitation of public auto camping grounds and the disposal of sewage from the camps and the hotel.

Muir Wood National Monument.—Conferences were held at Muir Wood regarding general sanitation, and assistance was given in the design of a sewage-treatment plant and a new water-supply system.

Stegomyia Mosquito Control along the Texas-Mexican Border.

Due to foci of yellow fever in the eastern part of Mexico during the summer and autumn of 1922 and the closeness of some of these foci to the Texas border (seven hours), considerable apprehension was felt as to the possibility of this disease being introduced into the United States. Clandestine entry into the United States from Mexico by way of the Texas border is not wholly controlled at the present time, and therefore only partial control over the introduction of disease into the country is possible.

Several conditions exist which would tend to make possible the rapid and rather general dissemination of the disease were it to enter the country, namely: The great prevalence of the stegomyia or yellow fever mosquito, *Aedes aegypti;* the relatively large population, practically all nonimmunes, in the sections near the border; and the automobile as a means of rapid travel not only from the district near the border to outside points but as a means of spreading the disease in the area that would first receive the infection.

The possibility of the introduction of yellow fever from Mexico is favored by the agricultural development of certain sections of the border district and particularly in the lower and eastern sections. These sections need at certain times and particularly at cotton-picking

times a large amount of labor which must be supplied by the Mexicans. Therefore, there is a large influx of Mexican labor coming into the country for a longer or shorter period during the summer months, and this labor in part comes from the interior. These conditions did not prevail the last time that yellow fever invaded the United States by way of the Texas border.

Stegomyia-control work had already been started in 1922 in the city of Laredo and carried to such a stage that the spread of infection would have been minimized, if not entirely prevented, during the 1922 season. A similar work started in Brownsville failed to produce the results desired, due to the lack of interest of the city authorities.

A study of the conditions existing along the border and the Gulf coast indicated that from the yellow-fever standpoint mosquito-control work carried on in certain sections would in all probability allow for a good control over the spread of the disease should it enter the United States, which entry would be almost a certainty if the disease reached the Mexican border. The upper border section was not considered to be in any appreciable danger, notwithstanding the fact that the time required between Tampico and El Paso by train is only three days. El Paso is carrying on active mosquito control, and the possibility of spread of mosquito-borne diseases in that city is almost nil.

The area below El Paso, extending to Del Rio in what is known as the Big Bend country, has no rail connection with the eastern section of Mexico nor with the surrounding sections in Texas. It is sparsely settled, and the entrance of yellow fever through this section, while perhaps possible, is hardly probable. At Del Rio there exists some possibility of introduction of disease, and it was thought advisable to encourage mosquito control at this point. The same applied to Eagle Pass, which is somewhat more important than Del Rio, since there is direct train connection with the eastern coast of Mexico.

From information obtainable as to opportunities for the bringing in of infection and the probable movement of those entering the country illegally, it appeared that efforts should be concentrated in the border section between Laredo and the Gulf and extend back to the line of the Texas-Mexican railroad. In this section it seemed advisable to carry on intensive work in all communities, large and small, within the counties bordering on the river and in the large communities back from the river but in the above-mentioned zone. Railroad facilities in Mexico make this section easily accessible from suspected districts, since direct rail connections exist between Tampico and Laredo and Brownsville. The latter line parallels the river on the Mexican side for the lower 85 miles.

In addition to the above section, the city of San Antonio appeared also to be of great importance, since it is the first objective point for the greater number who cross either legally or illegally and who wish to go farther into the interior. This city has a large Mexican population, whose habits are the same as those directly on the border, and it is therefore to all intents and purposes a border city, notwithstanding the fact that it is about 150 miles from the border. This distance, which in the earlier days acted as a barrier against the introduction of infection, is to-day of small importance, since good highways between the city and the border bring them within six hours of each other by automobile. In addition to San Antonio, it was also thought

advisable to have control carried on in the larger communities on the main highway between San Antonio and the border.

Since the greatest danger of the introduction of yellow fever from Mexico lies in the persons crossing the river illegally, control of spread of the disease should be possible if the vector of the disease can be controlled in the area within which these persons spend the first six days after crossing. These areas outlined would appear to answer, for the reason that: First, European aliens entering illegally must hide out in order to avoid apprehension by the immigration officials; and it is doubtful if they would be able to reach and leave San Antonio or Corpus Christi, the two points for which they head, within a period of six days or more. Second, the greater part of the Mexican laborers entering the country illegally come for the purpose of work and, being generally without finances, take up work at the nearest point, which will be in the valley section within the areas specified. While these laborers undoubtedly work north out of this area, it is doubtful if many do so within the relatively short time covered by the incubation period. The exception to this would be those who head for the larger cities, as San Antonio and Corpus Christi, which are also in the area.

Due to the possibility of maintaining a rigid maritime quarantine, there would appear to be relatively little danger of the introduction of yellow fever into the east Texas cities from shipping. The greater danger would be from the entry into these sections of those who have crossed the border and have found their way into the sections above mentioned. It is believed, however, that, while this is possible, the greater number so entering would have spent at least the period corresponding to the incubation period in the sections in which control work was thought necessary. The seaport cities were encouraged to take up mosquito-control work or to increase their activities along this line if some work was already being done. Some time was devoted to these cities, with encouraging results.

Arrangements were made by the city of Orange to carry on work during the present season.

At Beaumont some work has been carried on in the past, and plans were made for increased activity during the present season.

Houston has for the past few years carried on malaria-control work, which, following the dengue epidemic of 1922, was extended somewhat to include Stegomyia control. The force available was not sufficient to properly carry on the work, however. Following a partial survey of this city in June and the submission of a report to the city health officer, additional inspectors were obtained and more efficient control made possible.

In Galveston the commercial organizations were interested in the work, and through them active control work was started in June. The work in this city is being carried on under the supervision of the district engineer, as in the other districts.

All the activities, with the exception of Galveston, have therefore been confined, first, to obtaining as good control as possible in the communities directly on and adjacent to the river between Laredo and the Gulf, and, second, in those larger communities on the Texas Mexican Railroad and main highways between this railroad and the border and in San Antonio. In addition, this work has been encour-

aged at Del Rio and Eagle Pass, and the general supervision of the mosquito work at El Paso has been continued.

Enlisting the cooperation of the various incorporated communities, the counties, and in most instances the small unincorporated communities, is obviously slow work, and this, coupled with the lack of properly trained men, tended to further retard the work. It has not been possible, therefore, to have work started in all the communities in the districts outlined nor to have the work in many of the others progress to a point of control during the period since February, when the first steps in the control work were taken.

At the close of the fiscal year, however, the work had progressed sufficiently far to indicate that throughout the greater part of the district fairly efficient control should be obtained by August 1, and with the continuation of the work, efficient control by September 1. While control work of this type should be on an efficient basis by July 1, it is felt that the object for which the work has been carried on will be obtained if efficient control is possible on September 1. Considering the fact that it is necessary to have control work carried on in some 70 communities, ranging from a population of 150 to 183,000, that it is necessary to train not only the local inspectors but also the service inspectors employed, and that arrangements must be made in all of the communities for carrying on the work, as great headway could not be made as would have been desired. Actual work other than at Laredo and Brownsville was not possible until after the middle of May, from which time it was gradually extended so that by the end of June work was under way in 36 of the communities, with several more, including San Antonio, prepared to start work before the middle of July. Of the remaining communities, none are of any great size and for the most part they are small Mexican settlements.

DESCRIPTION OF AREAS IN WHICH WORK IS BEING CARRIED ON.

El Paso, Tex.—General mosquito work was started in El Paso in April, 1922, due to the overwhelming discomfort caused by this pest in 1921. This work covered all mosquito control, involving a rather extensive drainage problem. The continuation of this work has resulted in maintaining the city relatively free from mosquitoes of all species since July, 1922. The work was planned and directed by an officer of the Public Health Service. The cost of this work to date has been approximately $70,000..

Del Rio.—A survey of this city showed that Stegomyia mosquitoes were prevalent to some degree, sufficient to warrant the carrying on of control work. The malaria problem was also of considerable importance in this city. Plans were made for more or less intensive mosquito-control work to be undertaken, the work to start the latter part of June. Due to delays on the part of the city, this work was not started as expected.

Eagle Pass.—The survey of this city showed a considerable prevalence of Stegomyia mosquitoes, and they, with the other domestic mosquito. the Culicines, appeared to be the only problem. While conditions were not particularly bad in this city, it was thought advisable that work be carried on. Arrangements were therefore made and inspection and control work started the latter part of June.

Laredo.—Work was started in this city in 1921 and has been continued since that date. This city had an extremely large number of yard breeding places, which have been gradually reduced. Two sections of this city and the outskirts were not included in the original work and these have been taken up and included. This city is at present relatively free from mosquitoes, and the work has been continued sufficiently long to have educated the people in the question of control. This was very apparent in taking up work in the two new districts where the water barrel was the usual method used for the storage of water. Barrels were well taken care of and breeding was at a minimum. Control work has reached a stage in this city that precludes any opportunity for spread of infection.

Webb County.—With the exception of Laredo, there are only three small communities in the county in which it was thought advisable to have work carried on. Two of these have been surveyed and will be regularly inspected; the third has not as yet been visited. Conditions in the two surveyed were good, and control measures offer no great difficulty.

Zapata County.—This is a rather large county with a population of only 2,900, practically all Mexican, the greater part of the population being found in two small villages located on the river. This county is important in that a considerable amount of illegal crossing takes place. The two villages, San Ygnacio and Zapata, were surveyed in June, and work will be carried on in each. Conditions were much better than was expected. At San Ygnacio no container breeding was found, notwithstanding the fact that every house had one or more water barrels in use. This was probably due to the fact that an American physician there, and about the only American in the village, has advised the necessity of preventing mosquito breeding and informed the people of the danger thereof.

Starr County.—This county is on the river and at the head of the lower valley. It is a range county and rather sparsely settled. There are no incorporated communities in the county, although Rio Grande, the county seat, has a population of about 3,500. It was thought that the two communities, Rio Grande and Roma, would be the only two in which work would need to be started, but a survey has shown that there are about 20 small Mexican villages near the river in which control work will be necessary. The county is located just west of the point where the Mexican Railroad reaches the river, and, due to conditions which make patrolling of the border difficult, offers exceptional advantages for illegal crossing. Rio Grande is the only community, therefore, in which work has been started, and here the regular inspection work has been carried on by the quarantine inspector of the Public Health Service and a deputy sheriff.

Hidalgo County.—This county is in the section known as the Magic Valley. The lower half of the county is under intensive cultivation the year round. This area is under irrigation, which adds to the general mosquito problem. Container breeding is at a maximum, the containers for the most part being water barrels. In this county are 8 incorporated communities and 10 unincorporated Mexican communities. Control work is being carried on in all. The incorporated communities have put in force antimosquito ordinances and control is being carried on through local inspectors. One county inspector has been assigned to the work and acts in conjunction with the dis-

trict inspector. Cooperation has been obtained in the smaller communities, and help in control is being given by the leaders in these villages.

Cameron County.—The survey of Brownsville showed that from the standpoint of Stegomyia breeding it was the worst along the border, due to the general use of water barrels and cisterns. The city also has a general mosquito problem which interferes with the best control over Stegomyia, since the control over the container breeding does not reduce the mosquito prevalence to a point that is greatly noticed. It is hoped here that steps can be taken to reduce this mosquito prevalence, so that the container problem may be more easily handled. Work was started in this city in March, the city appropriating $250 per month for the work. Two of the inspectors are receiving a part of their salary from the Public Health Service. Considering the conditions existing, the work here has progressed very satisfactorily and yard breeding is fairly well under control. The latter part of June the work was extended to take in sections adjoining the city. In addition to Brownsville there are three other incorporated communities, each of which is carrying on the control work, having adopted an antimosquito ordinance and through its local inspectors they are making routine control inspections. In this county are three unincorporated communities in which control work is being carried on, the service inspector being assisted by local officials on each of his visits. It was hoped that the county would cooperate to the extent of one inspector, but such help has not as yet been obtained.

Kenedy and Willacy Counties.—There are but two small communities in these counties in which it is thought advisable to attempt to have control work carried on.

Kleburg County.—A relatively small amount of work is necessary in this county. The only community of any size is Kingsville, in which work has already started.

Brooks County.—The main highway out of the valley passes through this county, and it is along this route that travel toward Corpus Christi and the east takes place. The only community in which work was thought advisable is Falfurias.

Jim Hogg County.—This county, which is in what is called the second line, is not of great importance. Hebronville, on the Texas Mexican Railroad, is one of the larger communities along this road. It is planned to interest this community in control work.

Duval County.—Two communities in this county were considered important. Both are on the Texas Mexican Railroad and one of them, San Diego, more or less of a Mexican rendezvous, is in direct communication with the border. Both these communities are ready to commence control operations.

Jim Wells County.—Only one community, Alice, in this county would appear to be of importance. This city is on the Texas Mexican Railroad and is in the Cotton Belt. During the cotton-picking season large numbers of Mexican laborers will be in this section.

Nueces County.—This county is of considerable importance, as in it is the city of Corpus Christi. This is the point to which a large part of the aliens, particularly European aliens, who have crossed illegally, make their way. In addition it is the center of a large

cotton-growing area, and during the picking season large numbers of Mexican laborers are employed in the area near the city. This county also includes the smaller community of Robstown. Control work has been started in both communities.

La Salle, Frio, and Medina Counties.—These counties are crossed by the railroad and highway from Laredo to San Antonio, and it seemed desirable that in the larger communities along these roads some control work should be carried on. These places were not considered potentially as dangerous as other sections and steps have not been taken as yet to interest them in the work.

San Antonio, Del Rio, and Eagle Pass.—The necessity of taking up work in these cities has been discussed earlier.

The following table shows the communities in which work has been started and the results of the first inspections as to conditions as well as the results of the last inspection, made in June. As will be noted, a very material change for the better has taken place in practically all the communities, and the effect of the control work is very evident even in the short time that work has been carried on:

Stegomyia control—Report of inspections.

Community.	Estimated population	First inspection.						
		Date.	Premises.	Containers.		Breeding		
				Barrel.	Cistern.	Barrel.	Cistern.	Pupæ.
Laredo	30,000	May 2	4,897	105	234	5	0	0
East addition		May 3	273	198	34	18	3	
West addition		June 24	151	103	2	18	2	
Heights		June 24	1,479	85	36	6	1	7
Cuevitos	200	Apr. 28	34	34	1	0	0	0
Rio Grande	3,000	Apr. 27	431	336	31	102	6	25
Los Ebanos	300	May 14	57	73	7	6	1	2
Madero	250	May 3	50	47	3	6	1	1
Hidalgo	650	May 4	125	123	17	9	1	2
Penitas	300	May 14	57	38	11	5	1	1
Sam Fordyce	150	...do	25	11	6	6	1	2
Habana	200	...do	42	52	3	8	0	3
Mission	3,800	May 3	502	444	42	111	9	15
McAllen	5,300	May 1	855	727	61	268	20	40
Pharr	1,800	Apr. 28	357	210	1	52	0	12
Edenburg	1,500	May 10	278	178	5	58	7	18
San Juan	1,200	May 7	167	169	4	17	4	5
Alamo	500	May 5	60	49	3	18	0	3
Donna	600	May 8	101	36	5	3	0	0
East Donna	1,500	...do	164	106	69	23	18	6
Weslaco	800	May 9	146	110	4	32	0	10
Mercedes	4,100	May 15	555	185	25	55	5	10
La Feria	700	May 21	126	29	21	17	8	8
Harlingen	2,000	May 17	378	78	5	20	0	5
San Benito	5,000	May 19	862	340	17	40	1	10
Brownsville	12,000	Apr. 14	1,569	1,390	297	201	35	30
Santa Maria	400	May 22	79	12	10	4	5	2
Rio Hondo	400	May 23	80	23	1	4	1	
Point Isabel	600	May 25	107	94	31	29	15	10
Corpus Christi	15,000	June 5	3,120	1,586	1,051	491	201	265
Robstown	1,600	June 8	329	146	30	19	1	8
Kingsville	7,000	June 15	1,400	190	8	77	0	53
Mirando City	700	June 17	194	29	0	1	0	1
Minera	425	June 16	166	150	0	2	0	1
San Ygnacio	675	June 15	146	145	8	0	0	0
Zapata	650	June 14	123	119	6	7	0	
Grangeno	200	June 13	40	16	0	2	0	2
Kings Ranch	250	June 28	49	30	7	11	1	5
Del Rio	10,000	June 1	1,500	125	30			
Eagle Pass	7,000	June 9	1,200	68				

Stegoyia Control—Report of inspection—Continued.

Community.	Last inspection in June.							Per cent reduction in barrels.	Per cent protected.	
	Date.	Premises.	Containers.		Breeding.					
			Barrel.	Cistern.	Barrel.	Cistern.	Pupæ.		Barrel.	Cistern.
Laredo	June 29	4,890	102	234	20	0	0	(1)	00.0	100.0
East addition	June 30	276	100	34	9	0	0	49.5	00.0	100.0
West addition										
Heights										
Cnevitos	June 26	36	36	1	0	0	0	0.0	89.0	
Rio Grande	June 30	425	320	33	18	4	7	5.5		
Los Ebanos	June 25	96	75	6	2	0	0		85.5	83.5
Madero	June 23	60	45	3	1	0	0		80.0	66.6
Hidalgo	June 13	104	92	12	1	1	0	25.0	89.0	16.6
Penitas	June 26	50	27	10	1	0	1	29.0	74.0	20.0
Sam Fordyce	...do	25	10	8	0	0	0	10.0	60.0	0.0
Habana	June 25	44	40	5	1	0	0	23.0	100.0	40.0
Mission	June 16	460	229	48	5	0	2	48.0	87.0	88.0
McAllen	June 9	947	409	74	7	14	0	43.5	89.0	40.5
Pharr	June 21	360	125	7	7	0	1	40.5	71.0	
Edenburg	June 28	296	105	30	3	1	1	41.0	91.0	
San Juan	June 20	169	101	4	4	0	0	40.0	56.5	100.0
Alamo	June 15	67	19	3	0	0	0	61.6	89.5	
Donna	May 28	101	24	5	0	0	0	33.5		
East Donna	June 16		38	47	6	0	1	64.0	92.0	100.0
Weslaco	June 27	200	70	4	7	0	1	36.0	81.5	100.0
Mercedes	June 19	780	69	10	12	2	1	62.5	10.0	20.0
La Feria	June 26	123	5	24	0	0	0	63.0		
Harlingen	June 21	380	52	6	5	0	0	35.5		
San Benito	June 23	874	312	20	32	2	6	8.0		
Brownsville	June 30	1,785	968	343	77	13	2	30.0	(1)	(1)
Santa Maria	June 19	83	8	11	1	1	0	66.6	25.0	
Rio Hondo	June 18	76	11	0	2	0	0	52.0		
Point Isabel	June 25	119	102	30	19	5	4			
Corpus Christi	June 26	2,442	796	907	237	50	69	50.0		
Robstown	June 29	337	24	30	2	0	1	83.5	100.0	
Kingsville	...do	1,403	11	8	3	0	0	94.0		

[1] Containers listed are those in which water is stored for use. Small containers are not listed. Barrels include all containers having a capacity of a barrel. Cisterns include cisterns, wells, tanks, and large containers. Pupæ indicates full-grown larvæ and pupæ. Laredo and Laredo Heights control carried on since 1921, and barrels reduced from approximately 7,000. Last report on Brownsville included additions not covered in first inspection.

The interest taken by the authorities and individuals in the communities has been extremely gratifying and far beyond that thought possible. When it is considered that a very great part of the work is in sections populated entirely by Mexicans of the lower or peon class, and the control measures necessary meant the changing of some of the habits and customs of these people, the complexity of the problem is apparent.

The fact that the Stegomyia mosquito breeds only in artificial containers in and about human habitations makes for a rather inexpensive control, but requires that the individual householder be dealt with and educated. In the sections in which the work is being carried on, public water supplies are available to a part of those living in the more thickly built up parts of the larger communities and water containers are not necessary. In other sections and in small communities, water containers can not be eliminated, since the storage of water for domestic purposes is necessary. In a considerable part of the area water is hauled and sold by the barrel or carried by the householder from some water source or irrigation ditch. This storage of water in barrels is common throughout the whole area. In the eastern sections and, to some extent, in other sections, rainwater cisterns are also used to a considerable extent. The use of wells for

household water supply is limited and is only common to any extent in about three of the communities within the control area.

Smallpox Outbreak in Denver, Colo.

During the latter part of the calendar year 1922 there occurred an outbreak of virulent smallpox in Denver, Colo. In November, 1921, a case of malignant smallpox appeared; from November 1, 1921, to June 1, 1922, there were 276 cases, with 118 deaths, reported; from June 1 to September 1, 1922, there were 34 cases and 5 deaths, and from September 1 to December 31, 1922, there were 525 cases with 161 deaths. The peak of the outbreak was reached during the week ending November 11, during which week a total of 84 cases were reported, the total for the month reaching 252. At the request of the State health officer for assistance in the control of the situation, Passed Asst. Surg. Thomas Parran, jr., was ordered, on November 28, 1922, to proceed to Denver.

A rapid survey of the situation was made, and detailed plans discussed with the State and local health officials. Additional personnel were secured and their duties outlined. As complete vaccination of the population as was possible was undertaken, a thorough check being made of all public and parochial schools, and unvaccinated or unsuccessfully vaccinated children were excluded. Complete epidemiological investigations were instituted and infected premises disinfected by mechanical and chemical means followed by fumigation.

By the end of December the epidemic was well under control and the disease became milder in type. On December 14, 1922, Doctor Parran was relieved by Passed Asst. Surg. G. C. Lake. A number of towns throughout the State in which smallpox cases had occurred were visited and recommendations made to the health officials. The last hemorrhagic case occurred on December 11. The mortality from November, 1921, until about December 15, 1922, remained quite steadily at about 30 per cent.

Supervision of Interstate Travel of Diseased Persons.

The supervision of the travel of diseased persons on common carriers in interstate traffic and the transportation of things from disease-infected localities, together with general sanitary conditions on the carriers, has been continued as provided for under the interstate quarantine regulations.

DIVISION OF FOREIGN AND INSULAR QUARANTINE AND IMMIGRATION.

In charge of Asst. Surg. Gen. J. D. Long.

During the fiscal year 1923, officers of the Public Health Service engaged in the administration of the United States quarantine laws inspected 18,877 vessels and 1,811,246 passengers and members of crews at the continental maritime stations. At foreign and insular stations there were inspected 9,741 vessels and 1,231,699 passengers and members of crews destined for ports of the United States. There were 5,249 vessels fumigated or disinfected at domestic ports, and 2,549 at foreign and insular stations. At the border quarantine stations there were inspected, exclusive of the local interurban traffic, 75,236 travelers.

General Prevalence of Quarantinable Diseases.

Cholera.—As usual, cholera prevailed throughout the Orient during the entire year. During the summer of 1922 a considerable number of cases occurred in Eastern Europe, particularly in Russia, Rumania, and Eastern Poland. At no time was the United States seriously menaced by this disease, due to preventive measures applied at ports of departure for the United States.

Plague.—The fiscal year 1922–23 witnessed a general recrudescence of plague throughout the world in those localities where it ordinarily is endemic. A few cases occurred in several localities not usually considered to be infected, as at Paris, France. Rather sharp outbreaks occurred at various Spanish, Italian, and North African ports, emphasizing the fact that all Mediterranean ports must continue to be considered plague infected.

Smallpox.—The epidemic in the West Indies, generally reported as alastrim, continued throughout the year. A rather sharp outbreak of smallpox occurred in Gloucester, England, near the close of the year.

Typhus fever.—The epidemic of typhus which has persisted for several years in Eastern Europe has continued, although it appears to be gradually declining. The delousing of passengers prior to embarkation at European ports has effectually prevented the introduction of the disease into the United States.

Yellow fever.—But three cases of suspected yellow fever came to quarantine during the fiscal year. One of these was on the American schooner *William E. Burnham,* which arrived at the Mobile, Ala., quarantine station on September 14, 1922, 22 days out from Freetown, Sierra Leone, West Africa, via Paramaribo and Mungo, Dutch Guiana. This vessel spent about one week at Paramaribo and one week at Mungo immediately prior to departure for the United States. The other two cases reported occurred on the American tanker *Reaper,* which arrived at the Mobile quarantine station on October 26, 1922, four days out from Port Lobos, Mexico.

Because of the occurrence of a widespread epidemic of dengue fever throughout the Southern States during the autumn of 1922, and the unusual activity and numbers of the vectors of yellow fever (*Aëdes egypti* mosquito), it was deemed advisable in the spring of 1923 to enforce a somewhat more rigid quarantine against those ports suspected of being infected with yellow fever than had obtained during the previous year. Although no definite official reports of the occurrence of yellow fever had been received, unsettled conditions, persistent rumors of cases, and the great danger of the spread of the disease should a case be admitted into the United States, rendered imperative the enforcement of the quarantine laws and regulations without material relaxation.

Early in May, Senior Surg. C. C. Pierce was detailed by the Surgeon General to make an extensive survey of the yellow fever situation in the ports on the eastern coast of Mexico.

On May 20 an epidemic at Bucaramanga, Colombia, which had first been reported on March 12, 1923, was formally declared to be yellow fever by the Colombian Government. The disease has also been reported as prevalent in certain portions of Brazil and on the western coast of Africa.

Violation of Quarantine Laws.

During the fiscal year the department collected $2,785 in fines for violations of the act of February 15, 1893, because of the failure of masters of vessels to present American consular bills of health.

Transactions at National Quarantine Stations for the Fiscal Year Ended June 30, 1923.

The following tables summarize the transactions at the national quarantine stations for the fiscal year:

Transactions at continental national quarantine stations for the fiscal year ended June 30, 1923.

Station.	Vessels inspected.	Vessels fumigated.	Passengers and crews inspected.	Station.	Vessels inspected.	Vessels fumigated.	Passengers and crews inspected.
Alexandria	0	0	0	El Paso [1]			41,292
Atchafalaya (Morgan City)	0	0	0	Eureka	12	0	357
Baltimore, Md	698	374	27,621	Fort Bragg	0	0	0
Beaufort	1	0	717	Fort Monroe (Norfolk-Newport News)	585	181	23,461
Biscayne Bay	475	0	18,593	Freeport	189	0	4,149
Boca Grande	20	0	564	Galveston	774	135	28,503
Boston	1,240	254	131,575	Georgetown	7	0	56
Brownsville [1]			3,151	Gloucester	10	0	79
Brunswick	24	8	394	Gulf	66	24	1,409
Cape Fear	52	17	1,717	Hidalgo [1]			4,967
Cedar Key	0	0	0	Hoquiam	33	32	1,361
Charleston	157	36	4,786	Ketchikan	46	0	8,273
Columbia River	172	98	6,633	Key West	267	12	32,845
Coos Bay	23	3	1,019	La Jitis [1]			214
Cumberland Sound	41	1	1,279	Laredo [1]			21,710
Darien	0	0	0	Marcus Hook (Philadelphia)	1,125	449	38,520
Delaware Breakwater	7	0	221	Mobile	388	124	10,107
Eagle Pass [1]			2,230	Monterey	0	0	0
Eastport	359	0	29,635				

[1] Border stations. Statistics do not include "local" travelers, who, however, were subjected to cursory inspection. Through travelers were given close examination.

Transactions at continental national quarantine stations for the fiscal year ended June 30, 1923—Continued.

Station.	Vessels inspected.	Vessels fumigated.	Passengers and crews inspected.	Station.	Vessels inspected.	Vessels fumigated.	Passengers and crews inspected.
New Orleans	1,992	416	91,398	St. Andrews	37	10	385
New Orleans City	0	535	0	St. George Sound	0	0	0
Newport	10	0	313	St. Johns River	136	28	3,302
New York	5,962	1,453	1,091,946	St. Joseph	11	0	75
Pascagoula	28	0	328	San Diego	788	6	5,048
Pensacola	371	17	2,456	San Francisco	715	490	107,514
Perth Amboy	23	11	632	San Pedro	1,082	56	37,067
Port Angeles	45	11	412	Santa Helena [1]			327
Port Aransas	31	0	744	Savannah	114	14	4,947
Port San Luis (Port Harford)	35	0	1,279	Seattle	90	153	11,696
Portland	143	50	6,782	South Bend	1	0	45
Port Townsend	303	56	34,299	Tampa Bay	344	65	6,765
Presidio [1]			1,137	Vineyard Haven	2	0	18
Providence	149	1	10,531	Washington, N. C.	0	0	0
Rio Grande City [1]			203	Total	18,877	5,219	1,886,482
Sabine	594	129	19,392				

[1] Border stations. Statistics do not include "local" travelers, who, however, were subjected to cursory inspection. Through travelers were given close examination.

SUMMARY OF TRANSACTIONS AT NATIONAL QUARANTINE STATIONS FOR THE FISCAL YEAR ENDED JUNE 30, 1923.

Total [1] inspections: Vessels, 21,792; crew, 1,240,738; passengers, 941,723. Total personnel inspected, 2,182,461. Vessels passed on certificate of ship's medical officer, 412.

Vessels detained for observation or treatment (detention for purposes of inspection only not to be included).

	Nature of infection.							
	Yellow fever.	Rodent plague.	Human plague.	Smallpox.	Typhus.	Cholera.	Leprosy.	Total.
Vessels from infected ports [1]	122	2,178	50	73	819	1	4	3,247
Infected vessels [2]	2			15			6	23
Number of cases [3]	3			12			6	21
Number of crew detained	2,318		216	1,883		52	131	4,600
Number of passengers detained	120		603	483	4,681		193	6,080
Personnel disinfected				983	4,681	52	213	5,929
Personnel examined bacteriologically or vaccinated [4]	51	1,751		13,850	213	184	3	21,052
Vessels fumigated: [5]								
HCN	158	2,368		2				2,528
SO_2	7	2,997		15			3	3,022
HCN and SO_2	3	470		2				475
HCN and $CNCL_2$		27						27
Formaldehyde				1			2	3

[1] Refers to vessels held for observation when from an infected or suspected port, with no cases en route or on arrival.
[2] Vessels with cases on board at arrival or reported en route.
[3] Includes carriers.
[4] Includes microscopical examinations of blood, excreta, tissue, etc.
[5] Includes vessels fumigated after passing quarantine in accordance with provisional pratique.

Number of rats destroyed on ships 26,260; rats examined 25,979.

[1] An inclusive figure, regardless of treatment or report elsewhere.

Reports From Quarantine Stations.

Baltimore (Md.) quarantine.—Acting Asst. Surg. T. L. Richardson in charge. Post-office and telegraphic address, Curtis Bay, Baltimore, Md.

This station was concerned in the handling of quarantinable diseases as follows:

Smallpox: There were no cases of smallpox taken from incoming vessels. One case and two suspects were sent to the station from the city of Baltimore for observation and treatment. The patient recovered. The two suspects were detained until the period of incubation was completed and then discharged.

"Alastrim" or "Kaffir-pox": On April 23, 1923, the Norwegian steamship *Runa* arrived at this station from Port Antonio, Jamaica, with two members of the crew suffering from "alastrim" or "Kaffir-pox." They were removed to the hospital for treatment as for smallpox. The vessel and their effects were fumigated and three other members of the crew were vaccinated. The sick recovered and were returned to the vessel on May 9, 1923.

When the steamship *Runa* arrived on her next trip, May 7, 1923, two other members of the crew, who were suffering from "alastrim" or "Kaffir-pox," were removed to the station for treatment. They recovered and were returned to the vessel May 23, 1923.

The policy of allowing vessels to discharge their cargo before fumigation was continued during the year. Vessels arriving in ballast are fumigated upon arrival.

At a conference between Surg. B. S. Warren, director of public health district No. 2, Surg. M. H. Foster, Surg. M. K. Gwyn, and the medical officer in charge of this station, the question of adding the immigration inspections to the quarantine duties was considered and it was decided that the quarantine officers would assume this duty. This work was begun on December 12, 1922, and has been carried on successfully without increasing the medical staff.

Beaufort (S. C.) quarantine station.—Acting Asst. Surg. Christopher G. Hay in charge.

The station, which formerly was located at Fort Fremont, has been removed to the town of Beaufort.

Biscayne Bay (Fla.) quarantine.—Acting Asst. Surg. W. T. Lanier in charge. Post-office and telegraphic address, Miami, Fla.

During the year there has been an increase in the number of vessels calling at this port, particularly from the Bahama Islands. The port of Miami is growing very rapidly and in the near future it will be necessary to take up the matter of designating some regular place in the port for quarantine service.

Boston (Mass.) quarantine station.—Surg. H. W. Wickes in charge. Post-office and telegraphic address, Gallops Island, Boston, Mass.

There are two vessels attached to the station, namely the tug *Waterhouse* and the launch *Shearwater*, with crews of 10 and 3 men, respectively. These vessels are used for boarding, fumigating, and carrying passengers and supplies to and from Boston. The *Waterhouse* has been in use for nearly forty years, but is in good condition except for needing new boilers and some minor repairs. The *Shearwater* needs some general overhauling.

The station buildings under construction during the year have been completed. With the aid of the local architect's office, the delousing outfit, sterilizers, and kitchen and dining room equipment for detention barracks were finished in time for the expected flood of immigrants on July 1, 1923. The buildings as a whole are in good condition. Repairs to the administration building, the barn, and the old hospital building are needed. The sea wall, the wharf, and the roadway will need repairs during the ensuing year. With the installation of a salt-water fire-fighting system and the above repairs, the station will be at a point of maximum efficiency and lowest maintenance cost.

The routine work of boarding and fumigating vessels and inspecting passengers has increased. The cooperation of the medical personnel of the shipping lines and of the service representatives stationed at points of embarkation was excellent. It was found to be unnecessary to bring ashore a single immigrant or to hold in quarantine a single ship because of the presence of communicable disease or for other reasons.

A laboratory has been established at this station for the examination of rats for plague. During the year a total of 6,734 rats were examined, including rats trapped at Boston, Mass., Weymouth, Mass., Providence, R. I., and a number taken from ships fumigated at Boston, Mass., and Portland, Me. Composite inoculations into guinea pigs were made from all of the rats taken from fumigated ships and from most of the other rats brought to the laboratory. Those guinea pigs which died were carefully autopsied. Those which survived for a period of 14 days were returned to stock and in most instances used again for composite inoculations. No plague-infected rats were found nor did any of the guinea pigs show suspicious lesions.

Cape Fear (N. C.) quarantine station.—Acting Asst. Surg. J. Arthur Dosher in charge. Post-office and telegraphic address, Southport, N. C.

A considerable amount of repair work and some improvements were completed by the station force. The tender *Clara R*, which had become totally unserviceable, was rebuilt by the station force at no cost to the service except for some material which was found at the station and a small amount for repair parts for the motor. Although the boat is over 25 years old, it is now practically as good as new.

On May 24 the British steamship *Illingworth*, while leaving the station after fumigation, tore away a heavy cluster of creosoted fender piles and did other damage estimated at $1,250. Steps have been taken for the owners of the vessel to make the necessary repairs. Temporary repairs to protect the wharf from further damage have been made.

Charleston (S. C.) quarantine station.—Surg. J. H. Oakley in charge.

The volume of work done at this station during the last fiscal year was less than that of the year preceding.

No quarantinable diseases were encountered.

Columbia River (Oreg.) quarantine station.—Surg. H. M. Manning in charge. Post-office and telegraphic address, Astoria, Oreg.

Since December 8, 1922, 97 port sanitary statements were issued. The records of those issued previous to this date, together with the office and all its equipment, were destroyed by the fire which occurred on the morning of that date. Most of the other records were saved.

An electric-light plant, which has proved to be quite satisfactory, was installed at the quarantine station. The wharf was practically rebuilt.

Delaware Bay and River quarantine.—Surg. Carroll Fox in charge, Post-office and telegraphic address, 410 Chestnut Street, Philadelphia, Pa.

Practically all fumigation is performed at the wharves or in the stream at Philadelphia, Pa. Occasionally, vessels are fumigated at the quarantine station, Marcus Hook, Pa., but this is not the rule, since it is more convenient to fumigate at Philadelphia after the cargo has been discharged. In May, 1923, Surg. Carroll Fox was detailed as medical officer in charge of the entire Delaware Bay and River quarantine, comprising the Marcus Hook, Reedy Island, and Delaware Breakwater quarantine stations, in accordance with the plan to consolidate the quarantine and immigration activities of the service at the port of Philadelphia.

Four hundred and nine vessels were fumigated with either sulphur or hydrocyanic-acid gas. Of this number 115 were either remanded to Philadelphia by quarantine stations other than Marcus Hook for fumigation upon completion of discharge of cargo or were fumigated upon arrival in ballast at this port. Seventy vessels were remanded from Philadelphia to other quarantine stations for fumigation upon completion of discharge of cargo. Thirty-three vessels were remanded via Philadelphia to other quarantine stations for observation while discharging cargo at this port. Since the water frontage at Philadelphia is approximately 18 miles long, a considerable amount of time is consumed in reaching the vessels to be fumigated.

Two thousand and ninety-nine dead rats were recovered after fumigation. Rat count was not made in many cases in which vessels left promptly after fumigation before the holds were sufficiently free of gas to permit a search.

Delaware Breakwater (Del.) quarantine station.—Acting Asst. Surg. William P. Orr in charge. Post-office and telegraphic address Lewes, Del.

The station is not used at present but is in the charge of a caretaker. It is thoroughly equipped and can be manned and the necessary supplies can be procured on short notice if a vessel carrying quarantinable disease should be remanded here from some other station.

Eastport (Me.) quarantine station.—Acting Asst. Surg. John E. Brooks in charge.

No quarantinable diseases were encountered. Hundreds of small motor craft enter and leave this port daily. These small craft carry a total of more than 30,000 people each year, most of whom come to trade; but many come to work in the canning factories either here or at Lubec. Others enter on their way to the great manufacturing centers of New England.

Fort Monroe (Va.) quarantine station.—Surg. Hugh de Valin in charge.

Two vessels were detained on account of smallpox infection. The patients and exposed personnel were removed to Craney Island Station and there detained until deemed free as a source of infection. In each instance the vessel was disinfected.

Seventy-eight persons were vaccinated.

From July 1, 1922, to February 1, 1923, transportation to and from vessels arriving at this station was furnished to the United States customs officials.

The boarding and fumigating vessels have been painted and repaired. The launch *Gamma* was transferred to Tampa Bay quarantine station. A 33-foot steamer was secured from the navy yard, Norfolk, Va., for use at this station.

The buildings at Craney Island were repaired and painted by station labor. The medical officers' quarters at Fort Monroe, Va., have been painted and repaired.

From January 1, 1923, the imigration inspections of aliens, passengers, and crew have been made at this station.

Freeport (Tex.) quarantine station.—Acting Asst. Surg. J. R. Hawkins in charge.

Owing to conditions in Mexico, rigid inspection of crews of vessels engaged in transporting oil from Mexico to this port has been made, but no quarantinable disease has been detected at this station since it has been operated by the Public Health Service.

Physical examination and medical attention were furnished by the medical officer in charge to Coast Guard personnel.

Galveston (Tex.) quarantine station.—Senior Surg. G. M. Guiteras in charge.

The activities of this station comprise quarantine jurisdiction over vessels and the physical examination of immigrants entering the ports of Galveston, Houston, and Texas City. Vessels from foreign ports, or domestic ports infected with a quarantinable disease, anchor at the quarantine anchorage in Bolivar Roads about 1½ miles from the station, and are there inspected by the boarding officer.

An arrangement has been made with the Galveston and Houston Pilot Associations, whereby this office keeps in touch with all coastwise shipping which does not require inspection but which may be classed under the heading of "spoken and passed." A form giving the name of the vessel, ports of call, date of last American fumigation, character of bill of health, and health condition of crew and passengers is accomplished and signed by the master.

During the fiscal year 1923 this station has been principally concerned with measures to prevent the introduction of yellow fever and bubonic plague. Twenty-five vessels were treated on account of the former and 89 vessels on account of the latter disease.

No vessels arrived at this station with quarantinable disease aboard. The Spanish steamship *Barcelona* from Spanish ports and the Azores, bound for Galveston, developed a case of plague en route from San Juan, Porto Rico, to Habana, Cuba. The patient was removed at the latter port and the vessel was quarantined but not fumigated. She was fumigated at this port November 24, 1922. No additional cases developed.

During the greater part of the fiscal year up to April 3 the principal method of fumigation employed at this station was the so-called "cyanide process." Since that date the "cyanogen chloride method" has been employed. Sulphur dioxide is used occasionally when circumstances indicate the advisability of using this method and in certain cases when time can be saved thereby.

From December 14, 1922, to January 15, 1923, this office, in addition to its other duties, was in charge of the plague-eradication measures in the city of Galveston. The office in Galveston was closed on the latter date and the records and property removed to the quarantine station and stored.

At the time the plague-eradication office was closed its principal work consisted in the fumigation of vessels at the dock at intervals of three months, in accordance with bureau instructions; Galveston being still considered potentially plague infected. This fumigation work was taken over by the quarantine station.

After the closing of the plague-eradication office efforts were made to secure the cooperation of the city authorities to carry on a rat survey of Galveston. This was found to be impossible on account of the lack of funds. The last case of human plague occurred in Galveston November 14, 1920, and the last rodent case May 12, 1922.

Repairs and new construction: There was no new construction during the fiscal year, and only minor repairs were made to buildings and grounds. The hull and engine of the tug *Richardson* were thoroughly overhauled and repaired, and the vessel is now in good condition.

In view of the fact that the immigration inspectors have no boarding launch, the usual courtesy of permitting them to board incoming vessels at the same time with the boarding officer has been extended during the year.

Georgetown (S. C.) quarantine station.—Acting Asst. Surg. W. E. Sparkman in charge.

At the station on South Island the buildings are not now used and are in bad condition. The personnel at the station consists of the medical officer and a watchman.

Gloucester (Mass.) quarantine station.—Acting Asst. Surg. E. B. Hallett in charge.

During the past fiscal year 10 vessels were inspected and passed, all being granted free pratique.

In connection with these vessels, inspections were made of 77 alien seamen and 2 passengers, 51 of whom were vaccinated.

No quarantinable diseases were noted throughout the year.

Gulf (Miss.) quarantine station.—Acting Asst. Surg. C. A. Sheely in charge. Post-office and telegraph address, Gulfport, Miss.

As in previous years, quarantine inspection was conducted in the channel off Gulfport, and the detention station at Ship Island was maintained under the charge of a caretaker. No quarantinable diseases were encountered during the year.

Key West (Fla.) quarantine station.—Acting Asst. Surg. J. Y. Porter, jr., in charge.

There were no arrivals with quarantinable diseases on board; and one vessel only was held under observation for six hours pending diagnosis of a case of fever.

The equipment of this station consists of the boarding launch *Gannet* and the floating hospital *Wisteria*. The former, with the present high superstructure, is decidedly top-heavy and dangerous, and recommendations have accordingly been made to have the cabin cut down, thus making the launch more suitable for boarding purposes. Boarding of vessels is done in the outer harbor, where heavy seas prevail and it is essential that the boarding launch be in a seaworthy condition.

The floating hospital *Wisteria*, which went ashore in the harbor during the hurricane of September, 1919, is almost a complete wreck, and will have to be abandoned.

It is recommended that a suitable site on one of the adjacent keys, such as Ballast Key, be acquired where a quarantine detention station could be erected on piling. Such a station would have the advantage of being safe from all hurricanes, and be distant from the city of Key West about 4 or 5 miles.

Lake Sabine district quarantine.—Surg. T. J. Liddell in charge. Post-office and telegraphic address, Port Arthur, Tex.

The Lake Sabine quarantine district includes the ports of Beaumont, Port Arthur, Orange, Port Neches, Sabine, Sabine Pass, and other small ports on the Sabine Lake, Sabine River, and Neches River.

All ships from foreign ports and Galveston, Tex., entering the district have been required to be fended off from the wharves or docks not less than 4 feet; to be provided with fixed rat guards of sheet metal of an approved design and not less than 3 feet in diameter on all connecting lines; and to be fumigated every six months at the Sabine station. Gangways and ladders are to be raised at night unless they are lighted and guarded.

In November, 1922, Lake Sabine district quarantine and relief station No. 309, United States Public Health Service, were placed under the same medical officer, thus greatly facilitating the service activities in this vicinity.

Of the 807 port sanitary statements issued, 757 showed compliance and 50 noncompliance with the regulations. In checking the enforcement of these regulations a total of 6,979 inspections (day and night) were made.

Marcus Hook (Pa.) quarantine station.—Surg. F. A. Carmelia in charge.

As a result of the restrictive immigration act, no large immigrant-carrying vessels arrived direct at this station during the fiscal year.

Only one vessel was detained during the year. The American Steamship *Brammell Point* from Lisbon, via New York, with 31 persons aboard, was detained and treated for potential infection with smallpox, 2 cases having been reported as developing in former members of the crew who had been paid off in New York a few days prior to the arrival of the vessel at Marcus Hook.

Owing to the comparatively few regular line vessels calling at this port direct, the percentage of arriving vessels requiring fumigation was higher than the usual average—of 1,125 vessels arriving during the fiscal year, 344, or 30 per cent, required fumigation. The principal cargoes were fruit, sugar, crude oil, bulk mineral ores, and china clay. In addition there were cargoes of wood pulp, logwood,

cork, creosote, bones and wool, and general commodities. Vessels in ballast occasionally arrive.

One hundred nine, or 32 per cent, of the vessels which had entered the port under provisional pratique requiring fumigation upon completion of discharge of cargo, actually completed discharging at some other port, to which they were accordingly remanded for fumigation when empty. One hundred eighty-five, or 44 per cent, of the total number of fumigations were performed upon vessels which had been remanded here from other United States ports for fumigation following completion of discharge of cargo at this port.

An increasing tendency is noted for both passenger and freight carrying vessels to make Philadelphia a secondary or intermediate port of call. It is estimated that less than one-half of the vessels calling at Philadelphia from foreign ports made that port their primary American port, and required quarantine inspection at this station.

New Orleans (La.) quarantine station.—Surg. F. Faget in charge. Post-office address, Quarantine, La.

A number of persons, both passengers and crew, on vessels from infected or suspected ports were found to be ill on arrival at quarantine, and of these 106 were removed to the station hospital for observation and treatment pending definite diagnosis.

The following cases of quarantinable diseases were found: Leprosy, one case; smallpox, two cases (discrete).

The medical examination of aliens arriving at the port of New Orleans was continued during the year. A total of 3,524 passengers and 49,584 members of crews were examined, of whom 23 passengers and 74 members of crews were certified, and 57 passengers and 351 members of crews were ordered detained pending a more complete medical examination than could be carried out on shipboard at quarantine.

An ice-making and refrigerating plant was added to the station's equipment, the successful operation of which resulted in considerable economy.

The addition of a matron to the station force has made it possible to give patients in the station hospital more satisfactory treatment.

Newport (R. I.) quarantine station.—Acting Asst. Surg. Edw. V. Murphy in charge.

Most of the vessels inspected are oil tankers from Mexico, destined for Tiverton, R. I., where there is a refining station. In addition to these, storm-bound vessels occasionally make this port for supplies. At intervals pleasure yachts call at this port after visiting foreign waters.

New York quarantine station.—Surg. S. B. Grubbs in charge. Post-office and telegraphic address, United States quarantine station, Rosebank, N. Y.

Headquarters, which comprise general offices, supply depot, laboratory, and quarters for personnel, are at Rosebank, on the west shore of the Narrows. Boarding of all vessels, except those entering the port through Long Island Sound, is done from Rosebank. Such vessels are boarded from a substation at City Island. Port sanitary statements are issued from the Barge Office in Manhattan. Facilities are maintained on Hoffman and Swinburne Islands, in the lower bay, for the hospitalization, detention, and delousing of

persons removed from vessels. Vessels are fumigated at piers or anchorages.

New construction: At Rosebank a comfortable apartment house containing four sets of officers' quarters has been completed, equipped, and occupied. The extension to the south dock has been completed, a new flooring for the main part of it laid, an electric lighting system for the grounds and docks has been installed, and a new concrete garage built. At Hoffman Island two cement dormitories, with a capacity of 1,460 persons, have been finished and equipped with standee bunks. A kitchen, subsistence storeroom, bakery, and ice plant have been completed, and a 6-inch pipe to bring water from the city main, together with cables for electric power and light, have been installed. A small general hospital and new power plant have been completed and equipped.

Equipment: During the year three tugs have been received from the Army. One of the vessels was in condition for immediate use and takes the place of the tug *John B. Hamilton*, which has been condemned. Estimates have been secured for reconditioning the other tugs. A 100-horsepower semi-Diesel engine was installed in the *Bratton*. Two launches have been transferred to other stations and one has been condemned. One new truck, designed especially for fumigation work, was secured. During the year a considerable stock of miscellaneous surplus material has been received from the Perryville supply depot.

Personnel.

	On duty July 1, 1922.	On duty June 30, 1923.		On duty July 1, 1922.	On duty June 30, 1923.
Commissioned officers	4	6	Nurses	4	4
Acting assistant surgeons	11	10	Pilots	5	5
Pharmacists	2	2	Marine engineers	5	5
Scientific assistant	1	0	Other employees	164	157
Consulting bacteriologist	1	1			
Clerks	11	10	Total	208	200

Operation: The work of the station is performed under eight divisions: (1) Boarding; (2) laboratory (closely affiliated with the boarding division); (3) hospital, detention and delousing; (4) fumigation; (5) personnel and accounts; (6) property; (7) buildings and grounds; (8) mechanical and floating property board.

BOARDING DIVISION.

The duties of this division are the inspection of passengers and crews of vessels from foreign ports, in order to exclude quarantinable diseases and vermin and to enforce the proper disinfection and certification of certain articles of freight, to issue fumigation orders to those vessels requiring them under the regulations, and to instruct officers of vessels as to the assistance they shall give in order to expedite the work of the division and hasten the release of vessels from quarantine. In addition, crews of freight vessels are inspected in conformity with the United States immigration laws and regulations. The personnel consists of a medical officer in charge of the division, three medical officers attached to this station, two medical officers detailed from Ellis Island, and two male and two female inspectors.

Two steam tugs are assigned to boarding duty. Boarding begins at the nearest quarter hour to actual sunrise in winter, and in summer at 5 a. m. for cargo boats and 6 a. m. for passenger boats. Boarding continues until the even quarter hour following sunset in summer and until 6 p. m. in winter, during which season vessels will be boarded until 8 p. m. if request is made.

Every effort has been made to shorten the time of the quarantine inspection of each vessel without sacrificing thoroughness. The principal method of securing this has been through better cooperation on the part of officers of vessels. Mimeographed instructions covering every phase of the work on vessels carrying European steerage have been issued to all vessels concerned, and by strict adherence to the routine outlined in these instructions a considerable amount of speed has been attained. For example, on September 1, 1922, 10 large passenger vessels with a total of 7,705 passengers were cleared between 6 a. m. and 12.50 p. m. In case of a great rush of work, the boarding force is augmented by personnel from other divisions.

Close cooperation has been maintained and information freely exchanged between this station and service officers in Europe. Weekly reports of the number and origin of louse-infested persons arriving in quarantine are made to the Paris office. Detailed questionnaires have been made up at this station and the answers filled in and returned for our information by nearly all service officers at European ports. In several instances prompt information from our officers abroad of possible exposure of persons embarking for this port has enabled this station to take special precautions in the handling of such persons with a minimum delay to commerce.

Typhus fever: No cases of typhus fever were found on incoming vessels during the year, emphasizing the complete success of procedures at foreign ports to exclude the disease from persons coming to the United States. Nevertheless there has been no relaxation in efforts to exclude louse-infested persons on incoming ships. To this end, an intensive examination by trained inspectors of selected groups of passengers on all vessels from Europe—100 men and 100 women third-class passengers—is made. If more than 4 persons (i. e., 2 per cent) are found infested, the entire third class is examined intensively. All infested persons, together with their families, are removed for delousing.

Smallpox: Five cases of smallpox were found during the year on incoming vessels, and two developed after being passed. These occurred among the crew of the tanker *Bramwell Point*, 15 and 17 days from Oporto and Lisbon, respectively. The two cases developed 21 and 20 days, respectively, after the last contact with shore. Neither had ever been vaccinated. It is possible that these were cases with an unusually long incubation period, but more probable that a missed or unreported case occurred en voyage. Since this incident, vaccination is required if the vessel is from a port where smallpox is prevalent, even if out more than 14 days.

When smallpox is discovered on a vessel, or exposure is considered definite, all exposed persons are vaccinated and held. Each person, however, is released as soon as an "immune reaction" is noted. If the vaccination results in a "vaccinoid" or "take," the individual is held to complete 10 days from last contact in order to prevent the possibility of variola and vaccinia occurring simultaneously.

Owing to the possibility of persons developing smallpox after the lapse of more than 14 days, a modified quarantine was instituted against ports where smallpox was prevalent. All persons from these ports, irrespective of the time of departure, were inspected for vaccination. The unvaccinated and those with poor scars were vaccinated and held until reactions appeared. In the case of passenger vessels carrying doctors, some leniency was allowed, and if 21 days had elapsed, these measures were not enforced.

Persons vaccinated at the New York quarantine station were issued cards giving the name, age, height, and sex, and bearing the signature of the individual, together with the nature of the reaction. In certain cases, by arrangement with the agents, crews of vessels carrying doctors were vaccinated 36 hours before reaching quarantine. Upon arrival, all vaccinations were examined and cards issued for those showing immune reactions. On succeeding voyages, those who failed to receive cards the first time were revaccinated in the same way and cards issued if they were found to be positive. In this way a large percentage of the crews of certain lines have been rendered immune to smallpox, and, having vaccination cards, are also immune from smallpox quarantine at New York. The value of these cards was shown in the case of the steamship *Maracaibo*. Smallpox occurred on this vessel in October, 1922, and was handled at New York with but 16 hours' detention to the ship. Each member of the crew, however, was held until he could be given an immune certificate. In April, 1923, a second case occurred on this vessel. Twenty-one of the crew had vaccination cards and were immediately passed, thus supplying a skeleton crew for the vessel and eliminating practically all delay.

Owing to possible mistakes in diagnosis after landing, varicella cases were removed for hospitalization. No cases removed as such proved to be smallpox.

No cases of cholera, yellow fever, plague, leprosy, or anthrax were detected during the year. The policy at this station is to remove all suspicious cases to the hospital for study when the diagnosis is not clearly that of a nonquarantinable disease, and a number of suspicious cases were removed, but in all instances the diagnosis of some nonquarantinable condition was established, except in the smallpox cases cited above.

Seamen who are beneficiaries of the Public Health Service and who are in need of medical relief are removed to Hoffman Island and hospitalized if their condition suggests the possibility of a quarantinable disease. Through a special arrangement, they are carried as patients of the United States Marine Hospital at Stapleton. As their hospitalization is without cost to the steamship companies, it is hoped that masters of United States vessels will be encouraged to bring to the attention of the boarding officers all cases of illness on board. Contagious diseases sent from the two marine hospitals in Greater New York are also cared for.

LABORATORY DIVISION.

Two medical officers with two assistants operate the station laboratory, having on call for consultation the chief of the research laboratory, New York City Health Department. The primary

function of the laboratory is to assist the boarding division in diagnosis, and hence one or both of the laboratory officers are always on duty subject to the call of the boarding officers, ready with equipment to proceed on board any vessel. Such calls are frequent, as a laboratory officer must be consulted before any decision regarding suspicious illness on shipboard is made. In addition, the two laboratory officers, with the executive officer, are used as a reserve for ordinary boarding duty. By this arrangement there is no delay when a large number of ships arrive at the same time, although the regular boarding force has been reduced to that needed for the average number of arrivals. The laboratory also does the laboratory work for the hospital division and carries on research work on quarantine problems.

During the year studies of the "immune reaction" after vaccination against smallpox have been continued, and laboratory officers have supervised the making, observing, and recording of all such vaccinations. A detailed procedure has been adopted and over 1,200 vaccination cards have been issued. A report on this work entitled "Vaccination Technique and Certification" has been submitted for publication in the Public Health Reports. Extensive studies have been made in the delousing of clothing and baggage, with especial reference to the use of hydrogen cyanide gas. A continuous supply of lice and ova have been raised by the laboratory force, and about 200 individual experiments with baggage and clothing have been made. The data thus obtained already suggest several improvements in delousing methods and will be submitted shortly for publication. It has been shown, for instance, that to insure perfect results larger amounts of HCN must be used in the vacuum cyanide method of disinfecting baggage than have been so far recommended. Cyanogen chloride gas for fumigation has also been studied in cooperation with the fumigation division and a chemist from the Hygienic Laboratory. All medical officers detailed to this station are given a course of instruction in laboratory work pertaining to quarantinable diseases, and progress has been made in the standardization of quarantine laboratory technique.

The laboratory advisory board meets once a month with the medical officer in charge and the laboratory officers for the discussion of investigations of quarantine problems of special interest to this station. Surgeon Lavinder and Surgeon McLaughlin, on duty at other stations in Greater New York, together with Dr. William H. Park, consulting bacteriologist to the station and chief of the research laboratories, New York City Department of Health, at present are the members of the board.

During the year all rats sent to the laboratory (11,367) from vessels fumigated (764) were dissected and a careful search was made for appearances suspicious of plague. If such appearances were found, guinea pigs were inoculated with material from the suspicious lesion. From August 1 to October 29 subcutaneous inoculation tests into guinea pigs were made from all rats taken from vessels coming from plague-infected ports, regardless of macroscopic appearances. In making these tests one guinea pig was injected with an emulsion of organs from all of the rats taken from each vessel.

On October 29, 1922, the bureau issued orders to inoculate guinea pigs with emulsions from all rats—1 pig to 10 rats— and to examine

microscopically smears from each rat. This has been done with few exceptions. No case of plague infection has been demonstrated.

Laboratory division transactions.

Rats dissected and appearance noted:	
Mus rattus	5,124
Mus alexandrinus	4,620
Mus norvegicus	1,623
Total	11,367
Rats examined by inoculation test	8,677
Smears from rats examined microscopically	7,378
Rats suspicious on macroscopic examination	4
Rats suspicious on microscopic smears	4
Rats proved plague infected	0
Weil Felix reactions performed:	
Positive	0
Negative	213
Smallpox vaccinations performed by laboratory officers	419
Smallpox vaccinations inspected for reaction and cards issued	1,282
Blood cultures made	18
Blood smears examined	11
Urines examined, clinical	133
Urines examined for typhoid	57
Stools examined for typhoid	67
Widal reactions	29
Throat and nose cultures for diphtheria	8
Urethral smears	3
Feces examined for parasites	2
Sputum examined for tuberculosis	8
Triple typhoid vaccinations administered	29
Tetanus antitoxin administered	2
Vessels boarded by laboratory officers	392

HOSPITAL, DETENTION AND DELOUSING DIVISION.

All work was done at Hoffman Island, where new buildings and equipment were completed during the year. Swinburne Island was occupied by two caretakers and is always ready for emergencies. The personnel quartered on Hoffman Island consists of one medical officer, nurses, engineers, foremen, and attendants. The new hospital has a capacity of 30 beds and is easily administered. The old hospital with about 100 beds is used for cabin passengers, but is available for hospital purposes, if needed.

Delousing work has been done in the old delousing plant, the procedure being modified from time to time as indicated by tests made by the laboratory. Persons to be deloused land on Dock No. 1, on which is the baggage sterilization chamber with a capacity of 640 cubic feet. As they go through the dock building, they leave their baggage there. Baggage is disinfected by HCN gas, 125 ounces per 1,000 cubic feet (80 ounces per chamber). The steps in fumigation are: (1) 26 inches vacuum, generation of gas, 5 minutes; (2) wash through generator, 2 minutes; (3) break vacuum; (4) wait 1 hour; (5) second vacuum of 26 inches; (6) break vacuum; (7) wash through chamber 7 minutes; (8) remove.

Women and children are usually first brought to the waiting room, and as they pass to the undressing room each is given one small oilcloth bag for valuables and two net clothing bags, two safety-pin numeral tags, and two neck numeral tags to correspond. Jewelry and papers are put in an oilcloth bag, which they carry with them

through the bath. Articles of leather, rubber, furs, etc., which will be injured by steam are placed in one of the mesh bags and closed with a safety-pin tag. Other clothing is put into the second mesh bag and closed with the second safety-pin tag. Duplicate tags are carried about the neck. They then go one by one through the soaping room where they are thoroughly sprayed with a soap-gasoline-water mixture. (Stock solution—chip soap 1, water 4, gasoline 4. Soap and water are first mixed and heated until homogeneous. After cooling, the gasoline is added. For the spray solution this stock is diluted with water in the proportion of 1 part of stock solution to 5 parts warm water.) From the soaping room they go to the showers and then are given a bath towel. They are then sprayed (scalp, axillæ, and pubis) with "Chemo" a volatile oil preparation, and given a shirt or wrapper which is put on while they are waiting for the return of their clothing from the sterilizer. The mesh bags containing shoes, furs, etc., are put into one of the clothing sterilizing chambers and treated as follows: (1) 26 inches vacuum; (2) introduce HCN from 10 ounces of sodium cyanide (119 ounces per 1,000 cubic feet), 3 minutes; (3) wash through generator 2 minutes; (4) break vacuum and wait 30 minutes; (5) second vacuum of 26 inches; (6) break vacuum and wash through chamber 7 minutes; (7) remove and air out bags for several minutes before returning.

The mesh bags for steam sterilization are put into clothing sterilizing chambers and the jackets heated. A 25-inch vacuum is secured and steam turned on until 15 pounds pressure is obtained. This is held for 15 minutes. Steam is shut off, second vacuum of 26 inches is obtained, the vacuum is broken, and the bags are removed. The vacuum is produced in each case with electrically driven pumps, which save time and fuel.

Detention: The new barracks with a bed capacity of 1,440 were in use at the close of the year. They are light, airy, and easily cleaned. The old barracks are kept in commission, but will not be used except in emergency. The new kitchen and dining rooms are completely equipped and are now in use. Fire protection is assured by a system of high-pressure mains, chemical carts, and hand extinguishers. Frequent drills are held in which the entire personnel participates. Owing to the irregularity of the detention and delousing work, all employees in these sections have secondary duties which they perform when but few people are detained. These duties consist principally in repair and upkeep of equipment and buildings. By this means a large amount of work is done which would otherwise have to be done under contract at a greatly increased expense.

Detention and delousing activities.

Passengers detained	5,180
Crew detained	406
Passengers deloused	4,681
Persons vaccinated at Hoffman Island	633
Pieces baggage fumigated	4,643

FUMIGATION DIVISION.

Headquarters for the administration and supply of this division are at Rosebank. Crews and material are transported to vessels at their various docks or anchorages each day and are returned each night, by means of several trucks and one tug. The medical officer

in charge of the division has regularly four medical officers and others are assigned temporarily as needed. There are five fumigating crews, each composed of a foreman and four men, working under the immediate supervision of a medical officer. Hydrogen cyanide gas is used as routine, with an occasional sulphur fumigation. During the year the policy of fumigating only holds, forecastles, storerooms, and galleys was followed, except when inspection showed the probability of rodent infestation of other portions of the vessel. The usual practice is to fumigate after discharge of cargo, although in the case of vessels from badly infected ports, multiple fumigations are performed. This method was reported in Public Health Reports of January 12, 1923, in an article entitled "Fumigation of Vessels from Plague-Infected Ports." In these cases, a preliminary fumigation is done previous to discharge, inspectors are kept on board while discharging, and if live rats are seen in the cargo, the work is stopped and another fumigation is done. Finally the vessel is fumigated throughout after completion of discharge. This process yields a larger percentage of rats than the simple fumigation after discharge. The gas is generated in one of two ways: (*a*) *In situ*, by mixing the chemicals in open receptacles located in the compartments to be fumigated; (*b*) in a generator located on the fumigating tug from which the gas is conducted by a 1-inch hose into the compartments. In the fumigation of loaded vessels, this hose is introduced into ventilators and the gas liberated simultaneously above and below the cargo. The finding of dead rats deep in the cargo after using this method has shown that the fumigation of loaded vessels has a distinct value.

Rigid safety rules are enforced in the use of cyanide gas, each fumigation being under the personal charge of a medical officer who must remain on board until the ship is entirely safe. Inspections are made before fumigation to insure the removal of all unauthorized persons and the proper preparation of the vessel for fumigation. Gas masks are used, thus increasing safety. After opening up, fumigators are required to keep these masks with them continuously. Special masks have been supplied for use with cyanogen chloride, and these must be worn even on deck after opening up. Holds are tested with white rats before being entered by members of the fumigating party. In any event entry into holds is not permitted until one hour has elapsed after the hatches have been opened. During the latter part of the year the fumigation division has given cyanogen chloride gas a practical trial in the deratization of ships. In connection with the station laboratory and a chemist detailed from the Hygienic Laboratory a persistent attempt has been made to establish the practicability of this fumigant, but more work is needed before a satisfactory routine procedure under all weather conditions can be determined.

Since January 1, 1923, studies have been made to determine the relation between the type of vessel construction and the rat population as shown by the fumigation returns. As ship construction has become more and more nearly rat proof, an arbitrary division was made calling all ships built since 1914 class A, those built between 1907 and 1914 class B, and those built before 1907 class C. While acknowledging that certain exceptions to such classification must exist, it is interesting to note the average rat return, viz, class A, 4.76; class B, 9.1; class C, 12.1.

GENERAL.

All officers assigned to the station have been given training in the various operating divisions, including laboratory diagnosis. Several officers have received training before being detailed to foreign ports, and a number of ships' medical officers and public health officials from other countries have studied the operation of the station, some remaining one or more weeks. It is a pleasure to mention the excellent cooperation which has obtained with the district coordinator, the supervising chief engineer, and the various officers of the Army, Navy, Coast Guard, Customs, and Immigration Service, with whom the station comes in official contact.

FINANCIAL.

The pay roll for the station for the fiscal year amounted to $225,784.57. There was a decrease of over $3,000 a month between the pay rolls of the first and last months of the year. Other expenditures amounted to $185,228,88, making a grand total of $411,013.45.

Bills issued for services rendered during the year amounted to $275,586.40.

RECOMMENDATIONS.

At Rosebank the north dock is worn out and unsafe and should be replaced. Suitable fences should also be placed at points to the north and south of the station to prevent depredations. A suitable concrete storehouse for the dangerous chemicals used in fumigation should be constructed to replace the temporary buildings now in use, and an addition to the new garage should be built. At Hoffman Island great economy in the operation of the heating plant could be effected by the installation of a new coal dock equipped with a suitable coal conveyor and by the installation of a 100 horsepower horizontal boiler for use in mild weather, thus eliminating the excessive coal consumption of the large 250-horsepower boiler now in use.

It is hoped that the salary scale transmitted to the Bureau for the information of the personnel classification board may be made effective without delay. The work of the station is seriously handicapped by inability to secure efficient attendants at the compensation now allowed.

Pascagoula (Miss.) quarantine station.—Acting Asst. Surg. W. A. Cox in charge.

No case of quarantinable disease was encountered during the year.

Pensacola (Fla.) quarantine station.—Acting Asst. Surg. S. R. Mallory Kennedy in charge.

No quarantinable disease was encountered during the year, and no vessels were detained at quarantine.

Although hydrocyanic acid gas only has been used for fumigation at this station for the past two and half years, the change to cyanogen chloride gas mixture method was delayed because of the lack of gas masks, which arrived only a few days before the close of the fiscal year; however, the masks arrived in time to permit the fumigation of three vessels just prior to June 30, with very satisfactory results. The 15 rats picked up in the holds of the British steamship *Zamora* followed a fumigation by the cyanogen chloride gas method. It is a satisfaction to be able to report that no accidents have occurred.

During the fiscal year a state-wide movement to control the mosquito was started in Florida. To a State with 1,200 miles of coast and many ports of entry, lying in close proximity to countries where yellow fever is endemic and often epidemic, this move, strongly supported by the State board of health and the United States Public Health Service, is of the utmost importance.

Much good has already been accomplished. Active control measures have been put into effect at all ports of entry and in many other cities and inland towns. The medical officer in charge at this station has addressed large gatherings, pointing out the danger of permitting the aedes aegypti mosquito to breed unmolested, and has succeeded in securing the passage of the model mosquito ordinance.

The city of Pensacola has inaugurated active antimosquito measures, and in spite of the fact that the rainfall in Pensacola has been greater than normal, there are fewer mosquitoes this summer than have been seen for years.

Perth Amboy (N. J.) quarantine station.—Acting Asst. Surg. Charles W. Naulty, jr., in charge.

As noted in previous reports, the anomalous condition of increased port traffic with diminished work at the quarantine station has continued. During the past fiscal year there were 140 boats entered as arriving at this port with foreign cargo, yet the records of this station show only 23 vessels inspected and passed. This condition is due to the shallowness of the main ship channel leading to this port. Deep draft vessels proceed to their local destination after the roundabout approach from the Narrows, stopping at New York quarantine and returning down around through Staten Island Sound, entailing a loss of time in some cases from a half to nearly a day's working time. No boats arrived during the year with quarantinable diseases on board.

Owing to the limited amount of work and the lack of personnel, it has not been deemed advisable nor safe to resort to cyanide fumigation. Complaints on the part of several of the captains against the use of sulphur, because of the length of time and the destruction of textile materials and clothing, have been received. During the fiscal year 3 passengers and 1 stowaway arrived. Having been passed medically, they were referred to the local collector of customs, who is also acting immigration inspector.

The equipment and facilities are entirely adequate for the amount of work done.

Portland (Me.) quarantine station.—Acting Asst. Surg. Albert F. Stuart in charge.

The number of arriving aliens has been much smaller than usual, due to the restrictions placed on immigration by the United States and the Dominion of Canada.

Fumigation of vessels under the quarantine laws and regulations of 1920 has increased the work at this station considerably.

The wharf and buildings have been repaired and are now in good condition. A new steam sterilizing room has been constructed. The erection of a power house, the wiring of buildings for electric light, and the construction of storage facilities are contemplated.

Three hundred and nineteen dead rats collected from various parts of vessels after fumigation were sent by express to the laboratory at Boston quarantine station for bacteriological examination as to plague infection. No infection was found among them.

Port Townsend (Wash.) quarantine station.—Surg. Joseph Bolton in charge.

Three hundred and three vessels were inspected. These vessesl carried a total of 25,786 seamen and 8,513 passengers. The quarantine officers assisted in the medical examination of first and second class aliens on passenger-carrying vessels and in the examination of crews of freight vessels.

Cooperation with Government and other agencies: The bakery at Fort Worden was fumigated a number of times for the destruction of vermin. Steamship companies having vessels in the passenger-carrying trade were saved a number of hours per vessel and passenger by having the inspection made en route from Victoria, British Columbia, to Port Townsend or Seattle.

Improvements: The wharf, damaged by the *Florence Luckenbach*, was repaired by the Luckenbach Steamship Co. without expense to the Government. A new donkey boiler and disinfecting chamber, doubling the disinfecting capacity of this station, were installed.

Needs of station: A new warehouse, to replace one now used for steerage barracks, a first-class passenger barracks, to house about two hundred passengers, and a hulk to be anchored in Port Portland Bay, to be used for the docking of vessels to be fumigated in the bay, instead of at Diamond Point, are needed.

Providence (R. I.) quarantine station.—Surg. W. A. Korn in charge. One case of smallpox occurred in the person of a Portuguese immigrant on the French steamship *Roma*, July 1, 1922. The patient was removed to Providence City Hospital for isolation and treatment. As this case had been promptly isolated in the ship's hospital, all steerage passengers were carefully inspected, and those not showing a successful vaccination scar were revaccinated. The ship's hospital, one compartment and dunnage were disinfected.

Detention facilities at this station are not sufficient to detain the personnel of the average passenger vessel calling at this port. The station is a "floating" station, that is, it is wholly located on the hulk *Newark*, except the office, which is in the city. Not over 100 persons can be properly taken care of in detention, and any number in excess of this would have to be remanded elsewhere for appropriate treatment.

Sabine (Tex.) quarantine station.—Acting Asst. Surg. P. H. Chilton in charge.

All vessels entering the Lake Sabine district, which is made up of the ports of Sabine, Sabine Pass, Port Arthur, Port Neches, Beaumont, and Orange, are treated at this station. Inspection and fumigation, both incoming and outgoing, are performed here.

The present station consists of a residence for the officer in charge. This residence is in very bad condition and has been since its purchase in 1919. Its condition is such as to render it hardly habitable, as part of it has sunk below the level of the rest of the house, rendering the floors uneven and making a break in the flooring imminent. A new roof is needed, as the one on the house at present leaks badly during every rain, damaging the house itself and property therein. Great fire risk is present during the winter months on account of the construction of flues used with the heating stoves. Office space in the town and a building on the water front used as a lookout and storeroom are rented.

The floating equipment consists of two gasoline launches, the *Willie Hobby* and the *Everitt Sherrill*, both of which rendered satisfactory service during the year, the *Everitt Sherrill* being used as the regular boarding launch and the *Willie Hobby* for fumigation work and as a relief boat for the *Sherrill*. The *Sherrill* is in good condition, but some repairs will be necessary to the *Hobby* at an early date to insure continued operation without the necessity of laying it up later for extensive overhauling. The addition of two gasoline ventilating fans for fumigation work and of considerable other miscellaneous equipment brought the station's operating equipment closer to standard than formerly, tending to more efficient functioning of quarantine. During June, 1923, the Shipping Board vessel *Lake Elmsdale*, a steel cargo steamer, was transferred to this station and anchored below the town for use as a detention barracks for quartering crews and passengers either infected or suspected of being infected. It is contemplated that this vessel will be used pending construction of a quarantine station at this place.

The fact is not generally known that the district served by this station holds second place in the United States for tonnage handled. The facilities here are inadequate to handle properly the shipping that passes through Sabine Pass, and appropriate recommendations have been made, a site has been selected, and Congress has been asked for an appropriation for building a complete, modern quarantine station here. In furtherance of this project the station was visited by the Surgeon General during the year, who inspected both the present station and the proposed site for the new one.

Medical inspection of alien seamen and passengers for immigration purposes was continued.

San Diego (Calif.) quarantine station.—Surg. J. R. Hurley in charge. Post-office and telegraphic address, Point Loma, Calif.

Considerable repairs and improvements and a number of additions of new equipment tending to enhance the efficiency of the station were made during the year.

A new concrete sea wall has been constructed along 200 feet of the beach frontage of the station, which, it is believed, will stop the steady erosion of the land, which threatened to undermine certain contiguous buildings.

The dirt road which connects the end of the station paved roadway at the gate with the main paved highway has been reconstructed by the station force for its full length of 275 feet, and resurfaced with decomposed granite.

A new shingle roof has been given the office building, and all windows and doors in the detention barracks have been rescreened with copper wire cloth.

The station launch and motor truck have been overhauled and painted, and the attendants' mess kitchen and dining room have been repainted by the station force.

A practically new 2-ton Pierce Arrow motor truck, a machinist's engine lathe, a forge, and 400 new cot mattresses have been received. A number of gas masks, tools, and items of mess gear also have been purchased or transferred to the station during the year.

San Francisco (Calif.) quarantine station.—Surg. R. H. Creel in charge. Post-office and telegraphic address, Angel Island, Calif.

While the operations of the service at this station contemplate exclusion of all quarantinable diseases, the prevention of the introduction of plague is the chief concern, because of the intimate trade relations between San Francisco and plague-infected ports of the Orient. Potentialities as to the introduction of yellow fever are nil, as the intermediate host, Aedes aegypti is not found in this section of the country. Similarly, because of a lack of commercial intercourse with typhus-infected ports, typhus fever has been regarded as of slight menace. The most serious problem of a quarantinable nature at this port, therefore, is the exclusion of cholera, smallpox, and bubonic plague.

In order to prevent the admission of plague, efforts have been directed toward the maintenance of the trans-Pacific merchant marine as near rat free as possible. During the year 490 vessels were fumigated for the destruction of rodents; 244 by hydrocyanic-acid gas (including cyanogen chloride), 235 by sulphur dioxide, and 11 by the use of sulphur dioxide in holds and hydrocyanic-acid gas in superstructures. One thousand seven hundred and fifty-nine rats were recovered from fumigated vessels, in addition to a large number of mice. Of this number, 1,002 were *mus rattus*, 756 *mus alexandrinus*, and 1 *mus norvegicus*. This proportion of species is in keeping with previous observations made by quarantine officers. The disproportionate number of black rats and white-bellied rats over the Norway species is probably due to their well-known tendency to harbor within merchandise and thus be transported onto vessels.

Approximately two-thirds of the rodents recovered were found in the holds of vessels and approximately one-third in the superstructures. During the earlier part of the fiscal year accurate record of the location from which rats were taken was not maintained; but data obtained during the past eight months make it evident that the majority of the rats taken from superstructures were obtained in storerooms, galleys, crew's quarters, and similar compartments which provide ample harborage and available food. It can definitely be stated with respect to first-class liners that the finding of rats within first-class accommodations is a rarity.

It seems very probable that a considerable number of rodents were not recovered from vessels fumigated when partially laden. Of the 490 vessels fumigated, 231 were direct from plague-infected ports of the Orient or South America. The remainder were fumigated on account of the requirement for periodic fumigation or because they had visited plague-infected ports within the preceding four months. It is notable that of the vessels fumigated, rats were recovered from only 100, no dead rats having been found on the other 390 ships. In a few instances negative results may have been due to the fact that the vessel was laden with cargo, the rats having been killed within the cargo; but in the majority of instances the results can be attributed to the comparative absence of rats in the vessels. This especially was the case with respect to regular line vessels plying between San Francisco and the Orient, which are fumigated regularly each trip.

During the early part of the fiscal year vessels were fumigated by sulphur dioxide, but it was decided in October to adopt fumigation by the cyanogen-chloride method. Incident to delay in forwarding the chemicals, it was not possible to initiate this procedure

until February, and it was only during the last five months of the fiscal year that vessels have been fumigated by cyanogen chloride at this port. This fumigant, composed of 1 part hydrocyanic-acid gas and 3 parts cyanogen chloride, has an advantage over hydrocyanic-acid gas in that it is severely irritating to the eyes, nose, and throat, thus affording adequate warning to persons attempting to enter any compartment undergoing fumigation or before the compartment has been thoroughly ventilated. Nevertheless the same safeguards are still in force as obtained when vessels were being fumigated by hydrocyanic-acid gas. The crew and passengers are excluded from the vessel from the beginning of the fumigation until the vessel is declared safe for entry by the medical officer in charge; and prior to such decision all compartments, holds, and superstructures are entered in all parts by the medical officer and the fumigating inspector. The cyanogen-chloride mixture is somewhat tarnishing to brass, nickel, and silver, although by no means to the same degree as is sulphur dioxide. While apparently satisfactory for the destruction of rodents in the standards provided, it does not appear to have the same destructive action on roaches and other insects as does hydrocyanic-acid gas.

From time to time note has been made as to spontaneous combustion with production of fire within the containers. This appears to occur in compartments having high temperature and in those containers in which the gas is more rapidly evolved, producing greater concentration. In spite of these defects, in this method it is believed that cyanogen chloride is preferable to hydrocyanic-acid gas as a fumigant, because of the automatic warning provided through its lachrimatory properties.

The ventilation of holds of vessels after fumigation (and this especially applies to vessels with several "between" decks), still remains the most serious problem of the fumigation procedure. With a moderate wind blowing, ventilation by means of improved windsails is reasonably satisfactory, and the use of areothrust ventilators is fairly effective; but the latter device is difficult to transport, and the engine is of such a design that even with the most careful attention it is frequently out of order. Some effective means of ventilating holds of vessels is the most urgent need in ship fumigation. The smaller number of vessels fumigated during the fiscal year was due largely to the prolonged period in which sulphur was the only fumigant available. Many cargo-laden vessels were remanded to other ports for fumigation when empty.

During the latter part of the fiscal year a case of smallpox was found on the steamship *Maui*, inbound from the Hawaiian Islands. The source of infection was not evident, but the history of the case suggested that it may have occurred prior to the departure of the vessel to the islands. The case had been quite early diagnosed and immediately isolated by the ship's surgeon; and in view of these conditions treatment consisted merely in vaccination of the crew and the isolation of the case at the quarantine station. So far as is known no subsequent case developed in crew or passengers.

The usual precautions have been taken to prevent the admission of anthrax-infected brushes from the Oreient. All cargo manifests have been scrutinized by the boarding officers and consignments of shaving

brushes returned to port of origin unless accompanied by the prescribed consular certificate as to the bristles or hair having been sterilized prior to fabrication of the brush.

Relations between this station and other branches of the Government in the vicinity have been most cordial. Assistance has been rendered to the Immigration Service, through loan of the quarantine tug *R. M. Woodward* for transport service when the regular immigration vessel was out of commission. Station activities here have been greatly facilitated by transportation afforded through the Immigration Service for passengers and freight between the San Francisco waterfront and immigration station located near the quarantine station. The service has also been indebted to the Collector of Customs for transportation to vessels for boarding officers when the quarantine vessel was out of commission or otherwise employed.

Officers attached to this station have performed medical inspection of alien crews as a matter of assistance to the force of medical examiners on duty in the Immigrant Service at this port.

The fees charged to steamship companies for inspection of passengers and crew, and for the fumigation and disinfection of vessels, amounted to a total of $38,523.59.

San Pedro (Calif.) quarantine station.—Acting Asst. Surg. G. T. Van Voorhees, in charge.

The personnel of this station consists of one medical officer, one clerk, and one attendant, whose duties include the inspection and fumigation of vessels, inspection of aliens for the Immigration Service, examinations of masters, mates, and pilots, and lectures and examinations in first-aid work.

One case of smallpox was discovered on the coast-wise vessel *Ryder Hanify*. The patient was removed from the vessel and placed in the city pesthouse. The crew was vaccinated and the vessel fumigated. No other cases developed.

This port is in urgent need of a quarantine station and additional personnel in order to adequately carry on the work to be done here.

Savannah (Ga.) quarantine station.—Acting Asst. Surg. Barton Brown in charge.

Compared with the previous fiscal year, the number of vessels inspected decreased approximately 21 per cent, crew inspections about 22 per cent, and number of vessels fumigated decreased about 28 per cent. The large increase in number of passengers is accounted for by the U. S. Army transport *St. Mihiel* bringing in the last of our troops from Germany. This decrease in quarantine transactions does not give the true business conditions of the port, as many of the vessels arriving here with cargo to discharge put in at other ports for bunkers, and the quarantine and immigration work was done at those ports. Many of the vessels with cargo for other ports come to this port coastwise. No vessels were detained at quarantine except for fumigation.

Buildings have been kept painted and in repair and floating equipment has been kept in good order. All repairs to buildings and floating equipment have been made by the station force.

Tampa Bay (Fla.) quarantine station.—Acting Asst. Surg. M. D. Hollis in charge. Post-office and telegraphic address, Tampa, Fla.

This station is located on Mullet Key at the entrance to Tampa Bay from the Gulf, a distance of about 34 miles from Tampa. Since

the abandonment of both Fort Dade and Fort de Sota there is no connection with Tampa by wire or otherwise excepting the trips made by the station launch once or twice weekly to secure messages, mail, provisions, etc.

In November, 1922, quarantine activities were transferred from Mullet Key to Tampa. At the end of winter they were returned to Mullet Key, April, 1923.

TEXAS BORDER QUARANTINES.

The following table presents the data on the quarantine transactions on the Texas-Mexican border during the fiscal year:

Statistical data of quarantine transactions on the Texas-Mexican border for the fiscal year ended June 30, 1923.

Title.	Brownsville.	Eagle Pass.	El Paso.	Hidalgo.	Laredo.	Presidio.	Rio Grande City.	Terlingua.	Total.
Number inspected from interior Mexico	3,151	2,230	41,297	4,967	21,710	1,137	203	541	75,236
Number local passengers inspected	664,788	679,911	1,926,108	22,421	1,059,338	9,044	8,782	3,270	4,373,662
Total number persons disinfested	242	8,887	98,866	12	12,847	0	104	0	120,958
Total number persons passed without treatment	667,697	673,254	1,868,539	27,061	989,881	8,972	8,678	3,453	4,247,535
Total number persons vaccinated	2,765	3,840	33,409	294	30,820	1,209	524	357	73,218
Total number of sick held for observation	0	0	0	0	19	0	4	1	24
Total number of sick refused admission	39	0	32	11	650	2	14	0	748
Total pieces baggage disinfected	12,604	9,099	19,100	12	5,719	677	138	0	47,349
Number of cases typhus fever from July, 1922	0	0	0	0	0	0	0	0	0

Brownsville (Tex.) quarantine station.—Acting Asst. Surg. G. D. Fairbanks in charge.

The activities of this station during the fiscal year have been directed mainly against the introduction of yellow fever from the Tampico district of Mexico and the continuance of vaccination against smallpox. The Mexican border country has been badly infested with the stegomyia mosquito, consequently it has been very important to make the quarantine rigid. An efficient quarantine is very important to maintain in this locality because of the ease of crossing the Rio Grande River.

The number of aliens entering from the interior of Mexico has decreased considerably, as a result of better conditions of work in Mexico.

El Paso (Tex.) quarantine station.—Passed Asst. Surg. J. W. Tappan in charge.

During the past year vaccination against smallpox has been continued as usual. An attendant is on duty at all hours during which the port is open for traffic for the purpose of vaccinating arriving passengers from Mexico who do not show evidence of recent successful vaccination. The incidence of smallpox in El Paso during the year has been very small.

Freight cars coming from Mexico continue to be fumigated with hydrocyanic acid gas as a precautionary measure against bubonic plague and yellow fever and in conjunction with the campaign against the pink bollworm, instituted and vigorously carried on by the Department of Agriculture.

Bathing and delousing to prevent the introduction of typhus is strictly enforced. As formerly, passengers from the neighboring settlements around Juarez or those from the interior of Mexico who are obviously clean and not louse infested are permitted to pass for inspection without going through the disinfecting plant. All immigrants, however, who correspond to the steerage class at seaports of entry are required to bathe, to have their clothing and baggage disinfected (deloused), and to submit, if necessary, to vaccination. The working classes from Juarez known as "locals" are required to pass through the plant once each week. A bath certificate is issued to these and taken up after eight days, a new one being issued after each disinfection.

Travel from the interior of Mexico has been considerably increased during the year, owing to the resumption of train service over the Mexico National Lines with through service to the Union Depot, El Paso. Strict scrutiny of passengers is made by a medical officer, including examination for evidence of recent successful vaccination against smallpox. Passengers from Tampico, Panuco, Tuxpam, and other localities suspected of having yellow fever have, since May 1, been refused admission when it was found necessary to do so in order to complete the six days' detention period specified by the bureau.

Active cooperation has been rendered Sanitary Engineer R. E. Tarbett, in charge of yellow-fever control measures along the border, in mosquito-eradication work, and also to State, county, and city health officers in general measures.

Hidalgo (Tex.) quarantine station.—Acting Asst. Surg. W. P. Woodall in charge.

Service operations have been carried out in the usual manner and directed chiefly against the introduction of smallpox and yellow fever. This office has had the hearty cooperation of the local health authorities as well as the officials of the Mexican Government, who maintain a regular sanitary force in Reynosa, Mexico, located opposite this station.

On account of the uncertain conditions along the Mexican Gulf littoral and the undue prevalence of the yellow-fever-bearing mosquito in the lower Rio Grande Valley, a strict quarantine has been enforced against that area. All travelers arriving at the border from Monterey, Mexico, or beyond are required to present consular certificates showing their whereabouts for the six days preceding their arrival. All possible contacts are held in detention for the required period of six days.

Through the supervision and direction of sanitary engineers of the Public Health Service and the activities of the local health authorities, mosquito-control measures have resulted in a material abatement of the stegomyia in this section.

The gravest concern felt by those having knowledge of existing conditions is regarding the danger of invasion of quarantinable diseases through the surreptitious entry of undesirable Europeans who usually disembark at the ports of Tampico or Vera Cruz and direct

their course through the infected zones to the unguarded part of the frontier between this section and Laredo.

Laredo, Tex.—Acting Asst. Surg. Nat K. King in charge.

The active yellow fever quarantine against Tampico, Panuco, and Tuxpam, which was put into effect May 1, 1923, is the most important preventive quarantine measure of the fiscal year. There has been no typhus or smallpox epidemic in the Laredo district. The regular preventive measures of delousing all immigrants entering this port, together with complete disinfection of their clothing and baggage, and vaccination against smallpox of all passengers who have not had a recent successful vaccination, are in force.

Stegomyia control work has had special attention during the past year. In April the Surgeon General made a personal survey of this district after completing a tour of inspection of the towns along the border from Laredo, Tex., to Brownsville, Tex. As a result of this inspection Sanitary Engineer R. E. Tarbett was placed in charge of the Stegomyia eradication work. Mr. Tarbett has interested the population of the border towns, as well as those in the neighborhood, in this work, and it is believed that even if a case of yellow fever should get into this district no epidemic could result. Laredo proper is considered by Mr. Tarbett to be in good condition as regards the Stegomyia mosquito; the index of Stegomyia is low. The work of mosquito extermination in Laredo, begun two years ago by Sanitary Engineer J. A. LePrince and carried on by Sanitary Inspector J. M. Billingslea, of the Public Health Service, in cooperation with the sanitary department of the city of Laredo, has been kept up winter and summer. Laredo was the only town of considerable size in Texas which did not have a dengue epidemic in the fall of 1922, due, it is believed to the low index of Stegomyia mosquitoes.

Presidio, Tex.—Acting Asst. Surg. W. C. Moore in charge.

At various times it was alleged that quarantinable diseases prevailed in the neighboring town of Ojenaga, Chihuahua, Mexico. Investigation always proved them to be nonquarantinable. In cooperation with the local authorities attempts have been made to prevent the spread of epidemics of diphtheria and influenza.

Vaccination was regularly carried out. No case of smallpox has appeared since this station was established, November 2, 1919, although previously it prevailed every year.

The personnel of the station have kept a lookout for yellow-fever-conveying mosquitoes, but so far have found none.

Rio Grande, Tex.—Acting Asst. Surg. G. W. Edgerton in charge.

During the fiscal year quarantine restrictions have been carried out with the greatest of care, especially against travelers from Tampico and other parts of Mexico where yellow fever may exist.

Forty-seven Mexican aliens who were not in possession of certificates issued by American consuls were returned to Mexico. Four United States citizens from the suspected districts were held for observation, two of whom were sent to the base hospital at Fort Ringgold, Tex., the other two, who lived on the outskirts of the city, being observed daily for six consecutive days.

Since smallpox prevailed at several places in Mexico across from this port, every precaution was taken to prevent its introduction

into this country, and all passengers were vaccinated when it was indicated.

Bathing and delousing of passengers against typhus infection have been strictly enforced.

The medical department of Fort Ringgold, Tex., and Mr. G. A. Guerra, sheriff of Starr County, Tex., have cooperated in this work.

Improvements have been made to the building and bathrooms, and a sanitary toilet has been installed.

The quarantine guard at this station has assisted Sanitary Engineer R. E. Tarbett by inspecting all barrels and cisterns in the town once each week.

Terlingua, Tex.—Acting Asst. Surg. R. A. Wilson in charge.

This station is located in the extreme southern portion of the Big Bend district, midway between Santa Helena and La Jitis, and it is through these two latter places that travelers enter this district.

A mounted quarantine guard is continuously on duty along the river front in order to prevent clandestine crossing. In addition to the enforcement of the quarantine laws and regulations he cooperates with the Immigration Service.

Across the river from Santa Helena the Mexican Government maintains a garrison of about 300 troops.

There are some illegal crossings; but the country is sparsely settled and such crossings are believed to be relatively infrequent. Very few louse-infested persons have been observed.

TRANSACTIONS AT FOREIGN AND INSULAR QUARANTINE STATIONS FOR THE FISCAL YEAR ENDED JUNE 30, 1923.

Summary of transactions at foreign and insular stations (exclusive of Europe) for fiscal year ended June 30, 1923.

Station.	Total number of vessels inspected.	Number of vessels fumigated.	Total number of passengers and crews inspected.	Stations	Total number of vessels inspected.	Number of vessels fumigated.	Total number of passengers and crews inspected.
Aguadilla, P. R.	2	0	11	Jolo, P. I.	40	0	3,612
Ahukini, Hawaii	1	0	13	Kahului, Hawaii	4	1	138
Amoy, China				Koloa, Hawaii	5	0	132
Arecibo, P. R.	2	0	49	Lahaina, Hawaii	4	0	130
Callao, Peru	306	34	39,901	Mahukona, Hawaii	2	0	49
Cavite, P. I.	29	1	3,785	Manila, P. I.	823	129	125,651
Cebu, P. I.	71	120	3,677	Mayaguez, P. R.	59	0	3,702
Central Aguirre and Arroyo, P. R.	8	0	96	Olongapo, P. I.	0	0	0
Christiansted, Virgin Islands	17	0	283	Ponce, P. R.	89	1	2,114
Fajardo, P. R.	49	0	226	Progreso, Mexico	197	29	9,585
Frederiksted, Virgin Islands	48	0	3,963	Puerto Mexico, Mexico			
Frontera, Mexico	20	0	378	St. Thomas, Virgin Islands	473	18	18,718
Guanica, P. R.	72	2	3,961	San Juan, P. R.	389	125	30,250
Guayaquil, Ecuador	177		13,932	Shanghai, China	533	74	122,093
Habana, Cuba	1,731	74	175,772	Tampico, Mexico	1,363	824	44,087
Hilo, Hawaii	37	8	5,947	Tuxpam, Mexico	313	0	5,624
Hongkong, China	602	29	158,711	Vera Cruz, Mexico	359	203	15,809
Humacao, P. R.	15	0	176	Zamboanga, P. I.	34	0	4,033
Iloilo, P. I.	40	187	1,788	Total	7,914	1,859	798,387

CALLAO, PERU.

Acting Asst. Surg. J. L. Castro-Gutierrez in charge.

The work of this office increased over the previous year by 86 vessels. In view of the progress of the commercial relations of this part of South America it is probable that the number of vessels will increase each year.

Plague.—Data are not available as to the number of cases of plague occurring during the calendar year 1922. Three hundred and forty-six deaths occurred during that period, and it is estimated that there was a total of approximately 774 cases. These figures indicate that the situation of plague in Peru is unchanged. The lack of funds is the principal reason for the lack of sanitation in this country. The work is limited to the isolation of the sick, the disinfection of the infected houses, and the injection of Haffkine's vaccine in exposed persons. No measures are taken against rats, nor are bacteriological examinations of these rodents made.

SERVICE OPERATIONS IN EUROPE.

Paris, France.—Asst. Surg. Gen. Rupert Blue in charge.

The chief activities of the Paris office during the year included the supervision of the observance of the United States quarantine regulations at ports of embarkation and the collection of information relating to the spread of epidemic diseases of a quarantinable character. It may be said, therefore, that the central office, together with the field stations subordinate thereto, constituted the first line of defense against the importation of communicable diseases into the United States.

The efficiency of the inspection service abroad was materially reinforced by the assignment of a medical officer to Queenstown, Ireland, and the appointment of a temporary acting assistant surgeon at Boulogne, France. On account of the inauguration of a direct passenger service between Libau, Latvia, and New York, and the character of the emigration proceeding from Russia, it was found necessary to station an acting assistant surgeon at the former port. No changes, however, have been made in the regulations since the beginning of the fiscal year.

It was realized that while the sanitary situation in central and eastern Europe is gradually improving, it is not at all satisfactory and not likely to become so until economic conditions have become settled. Although sanitary statistics are now available from all countries, none have been received from the Austrian authorities, and for this reason the American consul at Vienna was unable to advise this office as to the occurrence of communicable diseases in that Republic. Letters have been received from the consul, however, reporting the prevalence of smallpox and typhus fever from time to time at Vienna. In the absence of definite information as to the conditions in Austria it did not seem advisable to discontinue the delousing and detention of steerage passengers originating in that section.

The special report forwarded weekly by the surgeon in charge of the quarantine station, New York, covering the sanitary condition of passengers and vessels arriving from European ports has aided greatly in establishing a satisfactory service on the European side. The information thus obtained has enabled the Paris office to check

up the work at the ports of embarkation and to locate the weak points in the line of defense.

Emigration from Italy, as in the past, has been carefully supervised by the national authorities who aim, apparently, to control the number of passengers embarking monthly so that the quotas allowed under the act of May 19, 1921, will not be exceeded. Prospective emigrants must receive permission of the authorities before embarkation, and are obliged to sail from the ports designated by them. Preference is shown to the following classes: (1) Unemployed men; (2) wives, without children, of men who are already in America; and (3) wives, with children, whose husbands reside in the United States.

PREVALENCE OF EPIDEMIC DISEASE.

With reference to plague, it has already been observed that the disease reappeared in Paris during the late summer of 1922, four cases, with two deaths, having been recorded from August 11 to August 18, 1922. A sharp outbreak was reported by the American consul in Malaga, Spain, although the details and the number of cases could not be ascertained; from February 5 to May 10 about 15 cases, with 3 deaths, were reported. In July three cases were announced in Patras, Greece.

It is of interest to note that rodent control is gaining in importance as a routine sanitary measure in certain countries of Europe. Hamburg, Liverpool, Manchester, Marseille, Naples, Paris, and Patras have continued to carry on operations with the object of reducing the rat populations in districts devoted to maritime commerce. The control of rats on vessels and freight wharves and the prevention of the passage of rodents between ships and the shore should be considered in the light of an obligation by maritime cities, and provision should be made in their sanitary budgets for the observance of such measures throughout the year. If this were done generally there can be no doubt that the cost of quarantine administration could be materially reduced within a short time.

Typhus fever and smallpox.—Following the retreat of the Hellenic Army from Asia Minor in September, 1922, and the subsequent arrival of thousands of refugees in southern Europe, smallpox and typhus fever menaced the western countries. Smallpox epidemics occurred in Gloucester and London, England; Lisbon, Portugal; Patras and Salonika, Greece; and in two cantons of Switzerland, including Zurich. The epidemic in Switzerland was characterized by an unusually low mortality, there being only two deaths in 2,000 cases.

Sporadic cases and small outbreaks of typhus fever were reported in many cities, including Barcelona; Belgrade; Budapest; Danzig; Lisbon and Oporto, Portugal; Libau; Marseille; and County Mayo, Ireland. During the month of May 90 cases were reported by the American consul in the city of Riga, Republic of Latvia.

Typhus fever has greatly diminished in Poland. According to the report of the Ministry of Health, the number of cases for the year 1923 will probably not exceed 10,000. From April 15 to April 21 there occurred in the district of Stanislawow 432 cases, with 23 deaths; and for the district of Kielce from April 8 to April 14, 419 cases, with 37 deaths.

No case of cholera was reported in Europe, outside of Russia, during the year. Reports were received early in July, 1923, however, to the effect that the disease had appeared in Constantinople among the Greek refugees from Turkey.

INTERNATIONAL CONFERENCES.

In addition to attending the October and May meetings of the Office International d'Hygiene Publique at Paris, the officer in charge of the Paris office was a delegate to the Peace Conference held at Lausanne from December 4, 1922, to January 23, 1923, and the conferences of the Advisory Committee on the Traffic in Opium held at Geneva from January 8 to January 14 and from May 24 to June 6, respectively.

With reference to the Lausanne conference it will be seen from the report, dated February 18, that the Turkish delegation agreed to accept the International Sanitary Convention of 1912 and the Hague Opium Convention of the same date. This draft of the treaty, however, was rejected by the Angora Government. The final draft, which was signed by the delegations at Lausanne in July, provides for the adherence or ratification by Turkey, as may be appropriate, of the International Sanitary Convention of 1912, with reservations as to articles 54, 88, and 90, and of the Hague Opium Convention, together with the additional protocol of 1914.

The establishment of peace in the Near East removed the last obstacle to the convening of an International Conference for the Revision of the Sanitary Convention of 1912.

Report of service operations in Europe, fiscal year 1923.

Place.	Number of passengers inspected.	Number of passengers vaccinated.	Number of passengers deloused.	Number of passengers detained.	Number of passengers rejected.
Antwerp, Belgium	[1] 18,187	15,721	11,700	11,700	105
Barcelona, Spain	279	38	13		
Bergen, Norway	2,404	1,623		5	
Bordeaux, France [2]	181	137			
Boulogne, France [3]	457	426		9	
Bremen, Germany	38,950	35,020	14,916	14,523	139
Cherbourg, France	34,901	22,715	20,088	17,127	
Christiania, Norway	8,948	8,948	81	2	
Constantinople, Turkey	3,352	3,352	3,352	109	
Copenhagen, Denmark	8,615	8,615	3,373	3,140	9
Cuxhaven, Germany	9,689	6,110	2,481	2,129	
Danzig, Free City	[4] 25,334	24,463	10,997		201
Genoa, Italy	18,485	13,465	13,600		4
Goteborg, Sweden	13,231	13,114	354	257	1
Hamburg, Germany	[5] 54,703	45,243	21,367	17,108	87
Havre, France	10,765	10,494	7,713	7,546	23
Libau, Latvia	[6] 8,001	7,690	7,754		80
Liverpool, England	67,026	10,426	8,882	196	15
London, England	4,385	2,695	64	37	59
Marseille, France	2,273	2,181	747	63	4
Naples, Italy	49,230	49,230	49,230		384
Palermo, Italy	6,204	6,204	6,204		
Patras, Greece	2,206	1,939	1,471	33	10
Piræus, Greece	4,002	3,577	3,577	15	5
Queenstown, Ireland [7]	3,259	3,259	766		
Rotterdam, Netherlands	14,970	6,809	7,467	4,793	
Southampton, England	18,538	18,538	1,919	1,713	
Stavanger, Norway	1,894	1,357	3	14	
Trieste, Italy	2,843	2,802	2,802		
Total	433,312	326,191	200,951	80,519	1,126

[1] 4,000 of these were transmigrants destined to Canada or the United States.
[2] Figures are for transactions since June, 1923.
[3] Figures are for transactions since December, 1922.
[4] 16,486 of these were transmigrants.
[5] 3,395 of these were transmigrants.
[6] 3,297 of these were transmigrants.
[7] Figures are for transactions since November, 1922.

Report of service operations in Europe, fiscal year 1923—Continued.

Place.	Number of pieces of baggage disinfected.	Number of pieces of baggage inspected without disinfection.	Number of vessels fumigated.	Number of bills of health issued.	Number of vessels inspected.	Medical examinations, seamen.
Antwerp, Belgium	13,035	18,977	6	560		
Barcelona, Spain	115	50	45	129		
Bergen, Norway				17		
Bordeaux, France [2]				94		
Boulogne, France [3]	957	604		19		
Bremen, Germany	15,614	47,987	22	114	22	
Cherbourg, France	37,179			291		
Christiania, Norway	138			71		
Constantinople, Turkey	5,310	1,205		72		
Copenhagen, Denmark	1,259	2,637	25	139	25	
Cuxhaven, Germany	4,831	14,948		13	13	
Danzig, Free City	10,771	1,806		49	79	
Genoa, Italy	3,514	11,583	84	362	87	
Goteborg, Sweden	367	23,405	1	82	23	
Hamburg, Germany	42,440	60,045	196	750	331	
Havre, France	12,387		32	278	79	
Libau, Latvia	8,571	2,273	8	21	69	
Liverpool, England	5,077	68,369	61	681	129	
London, England	32	5	27	541	25	34
Marseille, France	2,786	1,072	19	147	51	
Messina, Italy			2	82	82	
Naples, Italy	39,677	20,289	24	238	216	
Palermo, Italy	3,131	7,034	17	129	129	
Patras, Greece	1,360	1,099	32	32		
Piræus, Greece	3,610	965		69	69	
Queenstown, Ireland [7]	643	2,643		58	58	
Rotterdam, Netherlands	9,498	2,320	40	430	45	
Southampton, England	3,111	57,165	9	440	239	
Stavanger, Norway	3			18	18	
Trieste, Italy	96	3,379	37	50	38	
Total	225,872	349,860	690	5,976	1,827	34

GUAYAQUIL, ECUADOR.

Act. Asst. Surg. Carlos V. Coello in charge.

QUARANTINABLE DISEASES.

Plague.—Forty-seven human cases with 18 deaths occurred during the year, all in the city, except 4 that were reported from a near-by plantation. This number, compared with that of the previous year, shows a decrease of 25 cases and 2 deaths.

The disease is gradually decreasing due to the effective deratization carried on at present by the health authorities. According to official information 396, 185 rats were caught during the year, of which 25 per cent were examined, and 358 found infected with the *bacillus pestis*.

Efforts to "build the rats out" by modifying the old-fashioned system of construction have been emphasized as in the previous year. Double-walled houses are gradually disappearing, and cement as a material for construction is being adopted on a large scale.

It may be of some interest to note the course of plague in this region during recent calendar years.

	Cases reported.		Cases reported.
1916	843	1920	187
1917	372	1921	270
1918	279	1922	56
1919	66		

Smallpox.—Seventy cases of smallpox with no deaths have been reported during the fiscal year ending June 30, 1923, four of these cases having occurred in towns of the vicinity. The present occurrence of the disease is marked by the absence of mortality. As in the previous year, vaccination has been carried out extensively and isolation of the cases has been strictly enforced.

Recent smallpox vaccination is required of all passengers booked to the United States or Canal Zone ports.

Icterohemorrhagic fever.—The officer in charge of this station submitted to the Surgeon General on January 18, 1923, a report on some cases of icterohemorrhagic leptospirosis, said to have occurred in Guayaquil. A new case officially recorded was reported here in May; post-mortem examination was performed and specimens of abdominal viscera were obtained and sent to the Ancon Hospital laboratory. The report noted findings, with the exception of the negative Levaditi sections, compatible with a diagnosis of Weil's disease, but none characteristic enough to warrant such a diagnosis on the tissues alone.

GENERAL MORTALITY.

The total number of deaths in Guayaquil during the calendar year 1922 was 3,690, giving a death rate of 33 per 1,000 inhabitants (population 110,000), in 1921 the deaths totaled 3,808, and in 1920 they reached 4,921.

QUARANTINE RESTRICTIONS.

In February 1923, the Republic of Colombia discontinued the requirement of fumigation and antiplague vaccination that it had imposed upon vessels from Guayaquil.

Since January 1923, passengers entering any Ecuadorian port have been required to show a recent health certificate and a certificate of smallpox vaccination issued by a reputable physician and viséed by the consul of Ecuador at the port of embarkation.

NEW SANITARY BOARD CREATED.

Last March a consulting public health board was created in Guayaquil, composed of six members appointed by the chief health officer, their duties being to report the existence of any contagious disease of obscure diagnosis; to investigate any doubtful case of infectious or contagious disease appearing for the first time in the locality, and to assist the public health service of Ecuador in recommending sanitary measures.

HABANA, CUBA.

Acting Asst. Surg. Richard Wilson in charge.

On January 29, 1923, a telegram was received from acting Asst. Surg. J. Y. Porter, jr., at Key West, stating that three days previously, without his knowledge, a steward of the steamship *Governor Cobb* had been put ashore and had developed smallpox. As there was not enough vaccine at Key West, we were asked to vaccinate the crew at Habana. This was done with the assistance of Dr. Ponce de Leon, one of the port physicians.

On November 10, 1922, the Spanish steamship *Barcelona* from Barcelona and other Spanish ports, arrived at Habana, having been ordered here in quarantine from Santiago de Cuba, on account of having on board a case suspected of being bubonic plague. The diagnosis was confirmed bacteriologically at Habana. The sick man was sent to Las Animas Hospital. The vessel with passengers and crew was ordered to Mariel quarantine. On November 13 the vessel returned to Habana with its crew, after having been fumigated, and was allowed to discharge into lighters in the open bay. As no other case developed at Mariel, the passengers were brought back here on November 18. The vessel left Habana on November 21.

Upon request of Dr. S. G. Thompson, of the Florida State Board of Health, dated May 17, 1923, the Habana office resumed the former practice of filling out the regular forms of death certificates of the State of Florida to accompany corpses shipped to that State. This practice had been discontinued September 23, 1916, as the statistician of the Florida State Board of Health stated at that time that it was unnecessary.

FUMIGATION.

For several years vessels have been divided into three classes for the purpose of fumigation, namely: First, vessels fumigated by the United States Public Health Service. This includes vessels going direct to the United States or its dependencies, fumigated to comply with the quarantine regulations of the United States Public Health Service. Second, vessels fumigated by the Cuban quarantine, under the supervision of the United States Public Health Service. These are vessels that require fumigation by the Cuban quarantine regulations, and intend going later to the United States, usually via Cuban ports. At the request of the ship's agents, the United States Public Health Service fumigator goes on board to inspect the fumigation, and, if it is done in compliance with the United States Public Health Service regulations, he so reports and a certificate is issued. Third, vessels recommended for fumigation at a United States port (either on arrival or when empty, according to circumstances). These are vessels in transit, with more or less cargo or passengers on board on which account fumigation here was not advisable.

The following table compares the fumigations for the past five years:

Comparison of the fumigations of the last five years.

	1918-19	1919-20	1920-21	1921-22	1922-23
Vessels fumigated by the United States Public Health Service..	315	22	27	21	23
Vessels fumigated by the Cuban quarantine.....	105	188	219	152	51
Vessels recommended for fumigation at a United States port....	4	0	0	1	1

Principal transmissible diseases reported in Habana during the fiscal year 1922–23.[1]

Disease.	July-December, 1922.		January-June, 1923.		Total fiscal year, 1922–23.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Typhoid fever	642	113	224	45	716	158
Paratyphoid fever	28	4	7	2	35	6
Typhus exanthematicus	0	0	0	0	0	0
Malaria	692	27	393	11	1,085	38
Diphtheria	60	6	57	6	117	12
Scarlet fever	28	0	27	0	55	0
Measles	6	0	43	0	49	0
Chicken pox	37	1	148	0	185	1
Cerebrospinal meningitis	0	0	6	1	6	1
Leprosy	3	2	3	1	6	3
Yellow fever	0	0	0	0	0	0
Poliomyelitis	0	0	1	1	1	1
Ictero-Grave	0	0	0	0	0	0
Tetanus, infantile	2	2	0	0	2	2
Berberi	1	0	0	0	1	0
Bubonic plague	1	0	0	0	1	0
Smallpox	10	0	0	0	10	0

[1] The deaths are included in the number of cases.

QUARANTINE OPERATIONS OF THE SERVICE IN THE PHILIPPINES.

Surg. H. F. Smith, chief quarantine officer for the Philippine Islands, P. O. Box 424, Manila, P. I.; telegraphic address, Quarantine, Manila.

ACTIVITIES OF BUREAU OF QUARANTINE.

The chief quarantine officer acts as director of the bureau of quarantine service of the insular government and as quarantine officer for the port of Manila. The functions of the bureau of quarantine include the quarantine inspection of arriving vessels, consular quarantine, plague-preventive measures, including fumigation and port inspection, medical examination of arriving aliens, medical examination of applicants for marine licenses, and the maintenance and operation of quarantine stations.

PERSONNEL.

The officer personnel at the close of the year consisted of three commissioned medical officers at Manila and one at Cebu; two acting assistant surgeons, one being located in Manila and one in Iloilo; four part-time acting assistant surgeons stationed at the ports of Zamboanga, Jolo, Cavite, and Iloilo.

INCOMING QUARANTINE.

The United States quarantine regulations governing arriving vessels were in force throughout the year, inspections being made at the ports of entry from sunrise to sunset.

Inspection stations are maintained at the ports of Manila, Cavite, Cebu, Iloilo, Jolo, Olongapo, and Zamboanga. At the last session of the Philippine Legislature the following new ports of entry were designated: Sual, Tabaco, Legaspi, Pulupandan, and Hondagua. These ports have not yet been formally declared opened by the

collector of customs, but this will probably be done in the near future, and it will be necessary to provide inspection facilities for them.

The following tabulation shows a summary of the transactions under incoming quarantine during the current year at the present ports of entry:

	Number of vessels inspected.	Number of passengers inspected.	Number of crew inspected.
Cavite	29	835	2,950
Cebu	71	61	3,616
Iloilo	40	17	1,771
Jolo	40	713	2,899
Manila	823	47,610	78,011
Olongapo	0	0	0
Zamboanga	34	976	3,057
Total	1,037	50,212	92,334

PREVALENCE OF QUARANTINABLE DISEASES IN THE PHILIPPINES AND NEAR-BY ORIENTAL PORTS.

Cholera is still endemic in the Philippines, but there has been no marked outbreak during the current fiscal year. The disease has also been present practically throughout the year in Hongkong, Amoy, Shanghai, and certain Japanese ports. There was a marked outbreak of cholera in Shanghai during August, 1922, which probably continued up to the latter part of September. One hundred deaths among the Chinese population and one death among the foreign residents from this disease were reported for the calendar year 1922 in the district under control of the Shanghai Municipal Council. This is the lowest number of deaths, however, which has occurred in Shanghai from this cause in any year since 1919. Masters, owners, and agents of vessels and others concerned were advised by the chief quarantine officer under date of August 9, 1922, that cholera was prevalent in the port of Shanghai, both among the foreign and the Chinese population, and as to the precautions which it would be necessary for them to adopt should their vessels call at Shanghai prior to arrival in Manila. It is believed that these precautions were carefully carried out by Shipping Board passenger liners operating between Pacific ports of the United States and Manila via China and Japanese ports. They were probably fairly well carried out by other steamship lines. There was a sharp outbreak of cholera in Tokyo during October, 1922. The report for the 10 days ending October 10 of that year recorded 129 cases and 52 deaths. There was also an outbreak of cholera in Yokohama, and it is probable that the incidence of cholera there followed that of Tokyo, since the geographical relation of the two cities and the large daily interchange of population make it improbable that cholera could prevail in one and be absent from the other.

Stool examinations are made on all incoming Japanese aliens at the port of Manila, both for the detection of cholera carriers and for immigration purposes. The personnel of the bureau has been so limited that it has not been possible during the past year to extend this work to other ports, nor to include stool examinations of Chinese passengers arriving at Manila, but it is believed that during the

coming fiscal year stool examinations of all incoming Asiatics will be made possible by receipt of additional funds requested for the 1924 budget.

The following table shows the result of the stool examinations conducted on arriving Japanese during the year:

Total number of stool specimens examined	132
Positive for ascaris	11
Positive for trichiuris	10
Positive for hookworm	1
Positive for cholera	0
Total positives	22
Total negatives	110

All Japanese.

No case of cholera reached the Philippines on incoming vessels during the past year, nor were any carriers detected.

PLAGUE.

Amoy, Hongkong, Colombo, Singapore, and Saigon are still considered to be plague infected. A careful study of the plague situation in Shanghai was made by the chief quarantine officer in February, 1923. From this inspection it was learned that during 1922 over 19,000 rats had been examined in the municipal laboratory by a competent staff. No plague-infected rats were found during the year, the last rodent infection having been in 1920. The last case of human plague reported in Shanghai occurred in 1915, according to the records of the health department of the Shanghai Municipal Council. A sharp outbreak of plague occurred in Hongkong in June, 1923, with 60 cases and 64 deaths reported during the month. This outbreak was probably no more severe than the seasonal prevalence of the disease in years past for that city. It was perhaps not so serious, judging from the consular report, as the spring outbreak of 1922, during which year 1,181 human cases of plague were reported by the principal civil medical officer for Hongkong. Hongkong is the nearest and probably the most dangerous plague port from a Philippine standpoint, since it is only about 36 hours from Manila by the larger passenger vessels, practically all of which proceed directly from Hongkong to Manila. Shipping Board passenger vessels usually load from 200 to 300 tons of cargo at Hongkong for Manila. These vessels number from five to six per month. In many cases the cargo loaded in Hongkong might harbor rats. Antiplague measures by the local authorities in Hongkong are practically nonexistent, and apparently no effort is made either to control the disease among the rat population of Hongkong or Kowloon nor to prevent its spread to other ports through maritime commerce.

Cases of plague are not officially reported from Amoy, but the death reports show that plague prevailed during July and the early part of August, 1922. No additional deaths from plague were reported from Amoy until May 26, 1923, when the spring outbreak again manifested itself, but, judging from the consular reports, much more moderately than during the spring of 1922. Little reliance can be placed on reports from Amoy relative to plague owing to the very lax municipal regulations prevailing in that port. On June 5, 1922, conditions in Amoy were so bad that vessels on the Amoy-Manila run were ordered to

be fumigated each trip and were detained in quarantine for the time required to complete a period of five days from the date of their departure from Amoy. These vessels were required to discharge such cargo as they carried into lighters while at anchor in the bay between sunrise and sunset. These restrictions were moderated under date of August 28, 1922, at which time the number of deaths reported had so decreased that it was believed that plague should no longer be considered as epidemic among the human population of Amoy.

Amoy is only three days travel from Manila by steamer, but danger from this port is mitigated somewhat by the facts that very little cargo is carried between Amoy and Philippine ports, and cargo is loaded while the vessels are at anchor in the stream. The principal danger in this traffic is that the cargo and ships' stores, consisting largely of fruits and vegetables in crates, may harbor rodents and that persons infected with plague may be brought in during the incubation period of the disease. Vessels plying between Manila and Amoy usually bring between 300 and 500 steerage Chinese each trip and make a round trip in from 10 to 16 days. During the current fiscal year several suspected cases of plague were reported by the Philippine health service as arriving from Amoy, but in no case has such a diagnosis been confirmed. The last such case arrived on the American S. S. *Warren*, June 7, 1923, having left Amoy two and one-half days previously. The vessel was inspected, passed, and given provisional pratique, the temperature of all persons on board being taken. Two days later one Chinese died in the Chinese hospital after having been under treatment 16 hours. The death certificate by the attending physician gave the cause of death as undetermined, possibly bubonic plague. An autopsy showed nothing characteristic macroscopically Microscopical and histological examinations failed to show the presence of *Bacillus pestis*. This case is mentioned for the reason that, like previous cases, it is being carried by the Philippine health service on the weekly case report for the city of Manila as "last case of plague occurred June 9, 1923, but was not confirmed." It is being still so carried on the reports, although the director of the Philippine health service has advised the chief quarantine officer that the autopsy findings were negative for bubonic plague. No confirmed cases of plague have reached Philippine ports on vessels during the past fiscal year, and no cases have originated in the Philippine Islands, so far as this office has been able to determine. Extensive trapping operations have been carried on by the Philippine health service in the city of Manila and all rats caught were examined. No plague-infected rats were found.

SMALLPOX.

At the beginning of the fiscal year smallpox was present in Hongkong, Amoy, Kobe, Nagasaki, Tokyo, Yokohama, and Taiwan (Formosa). It was reported as present in Shanghai during the month of July. No unusual outbreaks in the Orient were reported until March, 1923, when there was an increase in its incidence at both Hongkong and Shanghai. During April, May, and June the cases in Hongkong showed a very marked increase, 29 deaths being reported for the week ending June 30, 1923. All Chinese passengers from Amoy, Shanghai, and Hongkong are required to present certificates of recent vaccination from the United States medical officer at the port from

which they sailed. Passengers failing to show such a certificate are vaccinated on arrival; 8,915 persons were vaccinated on vessels arriving at the port of Manila from foreign ports during the year. Smallpox has been absent from Manila since 1921, but is endemic in the southern islands. In addition to the vaccination of persons arriving from foreign ports, the quarantine service has been active in vaccinating the crews of interisland vessels, a total of 2,966 persons having been vaccinated. The total number of vaccinations performed by the bureau was 11,969. No cases of smallpox have reached the Philippine ports on vessels arriving directly from foreign ports during the current year.

CONSULAR QUARANTINE.

The activities in connection with consular quarantine consisted during the year of the issuing of bills of health to all vessels bound from insular ports to ports of the United States and its possessions. All vessels bound for ports of the United States and its possessions which were not routed through ports at which medical officers were stationed at consulates were inspected prior to sailing from insular ports. The inspection of passengers and crews of vessels leaving insular ports for ports in the United States when the route of such vessels took them through ports where medical officers were attached to the consulates was discontinued, the inspection being made by such medical officers attached to the consulate at the last port of call prior to arriving at a United States port. All cargo manifests were examined and viseed, shipment being refused such articles as were not deemed safe for shipment into United States ports. Stool examinations were conducted on all Philippine laborers bound from insular ports to ports in the Territory of Hawaii. A total of 2,801 stool examinations were made on this class of passengers. Two cholera carriers were detected in the course of these examinations and committed to the care of the Philippine health service for observation and treatment.

The method of procedure in connection with the work of consular quarantine at insular ports depends largely on the presence or absence of and the character of quarantinable diseases at or near such insular ports from which the vessel sails. During the past year there have been no marked outbreaks of any of the quarantinable diseases in the Philippines.

Bills of health were issued as follows:

Port.	Bills of health issued to—		Total bills of health issued.
	Vessels for United States ports.	Vessels for foreign ports.	
Manila	373	576	949
Cebu	171	49	220
Iloilo	89	42	131
Cavite [1]			29
Olongapo [1]			
Jolo [1]			40
Zamboanga [1]			55
Total bills of health issued	633	667	1,424

[1] The reports received from this station for the year did not separate the bills of health into the classification of those issued to United States ports and those issued to foreign ports.

PLAGUE PREVENTIVE MEASURES.

The rodent plague preventive measures in force during the year consisted of the fumigation of vessels with sulphur dioxide, the use of rat guards on all lines leading to docks and lighters, the breasting off of vessels 4 feet from wharves, the requiring of cargo nets to be removed at night and whenever cargo was not being actively handled, and the maintenance of watchmen on all gangways. All wharves and vessels moored thereto were inspected twice and sometimes three times daily to insure compliance with the above requirements.

During July and August of the fiscal year under report, vessels from Amoy were required to remain in quarantine a sufficient length of time to complete a period of five days from the date of their sailing from Amoy. Their passengers were then discharged into small boats and conveyed ashore. The cargo of these vessels was discharged into lighters between the hours of sunrise and sunset. Upon the completion of the discharge of cargo the vessels were fumigated throughout. The fact that sulphur dioxide was the only fumigant available during the past year prevented the routine fumigation of all cargo discharged under the above conditions into lighters. All cargo so discharged, however, was duly inspected for evidences of rodent infestation prior to landing in the port.

The question of the fumigation of lighters, cascoes, and other small craft used for the transportation of freight to and from vessels in insular ports has been considered, but their construction is such that efficient fumigation has rarely been accomplished, except at the expense of considerable time and money. Plans are under consideration with the bureau of public works for the construction of a practically gas-tight shed in the form of a boathouse into which lighters, cascoes, and other small craft may be floated, the doors of the shed closed and the cargo of such small craft fumigated en masse. The fumigant to be used for this work will be the cyanogen-chloride gas mixture. It is believed that such an arrangement will furnish efficient fumigation at a minimum expenditure of time and money. A bill has been prepared for presentation to the Philippine Legislature requesting an appropriation of ₱50,000.00 for the construction of this building and the purchase of material necessary for the fumigations. The present method of unloading cargo from vessels arriving from plague-infected ports or ports suspected of plague infection into lighters and depending upon the inspection of the cargo for evidences of rodent infestation as a means of preventing the introduction of plague is felt to be fraught with danger. This statement is based on the fact that the lighters when loaded with cargo which may harbor plague-infected rodents which have escaped observation are usually towed up the Pasig River and into some of the smaller canals, which lead into the most congested part of the city, for unloading. Facilities for the fumigation of cargo while in the holds of the vessel prior to discharge is one of the urgent needs of the quarantine service in the Philippines.

The following table summarizes the fumigations during the fiscal year 1923:

Port.	Number of vessels fumigated.	Number of rodents found dead after fumigation.
Cavite	0	(1)
Cebu	120	(1)
Iloilo	187	(1)
Jolo	0	(1)
Manila	110	1,751
Mariveles	19	(1)
Olongapo	0	(1)
Zamboanga	0	(1)
Total	426	1,751

[1] No record of number of rats recovered kept by station.

Prior to the expiration of the past fiscal year no records were kept as to the number of rodents found dead on vessels after fumigation at any of the stations, with the exception of Manila. This condition will be corrected, however, at the beginning of the coming fiscal year, instructions relative to the importance of ascertaining the number of rats destroyed by fumigation having been issued to all stations. In addition, arrangements are being made for the examination for plague infection of all rats killed by fumigation at Cebu and Iloilo. No plague-infected rats were found among the 1,751 rodents recovered in Manila after fumigation.

TRANSACTIONS OF INDIVIDUAL STATIONS.

Manila.—United States quarantine station, Manila. Surg. H. F. Smith, in charge. Post-office address, P. O. Box 424, Manila P. I; telegraphic address, "Quarantine," Manila, P. I.

The report for the port of Manila follows that of the bureau so closely that there is little, if any, additional comment to make.

The following comparative tabulation shows the transactions at the port of Manila during the past five years:

	1919	1920	1921	1922	1923
Vessels inspected	597	781	833	775	823
Passengers and crew inspected	91,789	135,250	131,741	129,043	125,651
Vessels fumigated	100	176	162	181	129
Bills of health issued	627	858	962	875	949

Mariveles.—United States quarantine station, Mariveles. Post-office address, Mariveles, Bataan, P. I.; telegraphic address, Quarantine, Mariveles, P. I.

Mariveles quarantine station is for administrative purposes operated directly under the bureau at Manila. The work at the station is not sufficient to warrant the detailing of a medical officer there at all times. More or less unsuitable quarters only are available, and an officer is detailed there at any time that the work requires his presence.

The following tabulation shows the activities of the Mariveles quarantine station for the present year:

Mariveles quarantine station.[1]

Vessels calling at station for treatment	16
Vessels disinfected or fumigated	16
Persons bathed and effects disinfected	956
Persons vaccinated	836
Persons detained in quarantine	804

The activities as shown above included the cleansing and disinfection of Coast Guard cutters, which had been employed for the transportation of lepers from the various ports of the islands to the Culion leper colony; 92 members of the crew and 160 passengers were bathed and over 3,500 pieces of clothing were sterilized. At each call a complete and thorough fumigation and disinfection of the vessel was made. At the request of the bureau of agriculture, two vessels engaged in carrying cattle were remanded to Mariveles for fumigation and disinfection after having transported diseased animals.

On July 7, 1922, the Coast Guard cutter *Basilan*, en route to the leper colony at Culion with 113 lepers on board, was forced into Mariveles Bay for shelter during a typhoon. All of the lepers were landed, counted, and quartered in barracks under guard. On July 9 the weather moderated sufficiently to permit the lepers to return to the vessel and continue on their way to Culion.

On January 25, 1923, seven former Russian naval vessels entered Manila Bay without bills of health, having cleared from the port of Shanghai. These vessels were carrying Russian refugees from Vladivostok. The bureau of quarantine had been previously advised as to the probable date of arrival of these vessels, which were convoyed by American naval forces into Mariveles Bay. The sanitary condition of the vessels was very bad, although no quarantinable diseases were found on board. The entire personnel were bathed, vaccinated, and given a careful physical inspection. All clothing and bedding were sterilized. Vessels were fumigated throughout; decks and the superstructure washed down with bichloride solution. A new supply of fresh water was furnished the vessels. The women and children were permitted to remain on shore and were quartered in the barracks of the station. The men were returned to the ships after fumigation was completed and the sick placed in the hospital. On January 30, 1923, one, and on February 1, three additional vessels of the same type and carrying Russian refugees, arrived at Mariveles. These vessels were accorded the same treatment as that given the original fleet. At the request of the Governor General of the Philippine Islands, the Russian refugees were permitted to remain on the quarantine station until March 30, when they were removed to Olongapo under the supervision of the United States Navy. The total personnel of all Russian vessels treated consisted of 621 crew and 183 passengers, including a large number of women and children. Practically all of the men capable of working were carried as members of crews, although many of them were formerly officers and enlisted men of the Imperial Russian Army and Navy.

Routine repair work to buildings was carried out by the station force. Very little work was done on the building formerly used for cabin passengers as the expenditure of money for the repair of this

[1] These activities are included in the general report under the operations of the Manila station.

building would be false economy because of its deteriorated condition. It is believed it would be in the interest of economy to demolish the old building and erect a concrete structure in its stead. The station force, with the addition of some skilled mechanics, is able to supply all of the labor necessary for the construction of a new building. The office building, cabin and steerage bathrooms, and detention room were under repair practically throughout the year. A new fender system was installed along the face of the quarantine wharf. This work has been done by the bureau of public works.

Among the other needs of the station are a new power plant and the necessary housing for same, a refrigerating plant, and a concrete morgue building. It is hoped to install at least a portion of these needs during the coming fiscal year.

A lighthouse has been maintained at the station for the insular bureau of navigation throughout the year and weather signals displayed by day and night as directed by the Philippine Weather Bureau.

Cebu.—United States quarantine station, Cebu, Cebu, P. I. Surg. D. J. Prather in charge. Post-office address, P. O. Box 97, Cebu, Cebu, P. I.; telegraph address, Quarantine, Cebu, P. I.

The quarantine station is located on the island of Cauit, a short distance from the city of Cebu. An office is maintained in the city. Transportation and boarding facilities are provided by the steam launch *Sanidad.*

The following comparative tabulation shows the transactions at the Cebu quarantine station during the past five years:

	1919	1920	1921	1922	1923
Vessels inspected incoming	73	34	50	75	71
Passengers and crew inspected, incoming	4,801	1,711	2,846	5,837	3,677
Vessels fumigated	116	108	82	71	120
Bills of health issued	57	71	130	150	220

A vessel arrived in August, 1922, from Saigon, Indo-China, with one fireman severely ill and presenting symptoms of cholera. Three other members of the crew were suffering from a milder type of dysentery. Stool specimens were obtained from all of the crew, cultured and examined for cholera vibrio by the Cebu branch of the bureau of science. The stools were negative for cholera, and the ship was released. The bill of health from Saigon presented by this ship on her arrival showed 2 cases and 2 deaths from cholera, 3 cases and 2 deaths from smallpox, and 4 cases and 1 death from plague.

One vessel engaged in domestic interisland trade arrived at the port of Cebu on April 12, 1923, with one case of smallpox on board. Although the man had been sick for three days with an eruption, the master of the vessel was not aware of the fact until the ship had been in port for several hours. The vessel was ordered to the station, all passengers and crew were vaccinated, bathed, and their personal effects and bedding sterilized by steam under pressure. The living quarters of the vessel were fumigated with sulphur and the decks washed down. All passengers and crew showing evidence of recent

successful vaccinations were allowed to depart with the ship on the termination of the fumigation. Thirteen members of the crew, including the case of smallpox, were detained to complete the incubation period. The case recovered without incident, and no new cases developed. There was no actual evidence as to where the infection was contracted. The master of the vessel stated that he had seen at least a dozen men with an eruption similar to that of the smallpox case walking the streets of the town of Bais, where his ship had been 12 days before. Another vessel engaged in the domestic interisland trade arrived May 8, 1923, with one case of smallpox. The vessel was given the routine treatment, the personnel were vaccinated and those who showed no evidence of recent successful vaccinations were detained at the station. No new cases developed.

One vessel was fined during the year for arriving without United States bills of health from the five previous ports of call.

All fumigation done at Cebu is by means of sulphur dioxide for the holds of vessels and formaldehyde for superstructures. During the year authority was obtained from the insular government to use a portion of ground and a building on the water front for the city office of the quarantine station. A new dock was built at this site by the station force for the accommodation of the boarding launch. The launch *Sanidad* was extensively repaired during the year at a cost of about $4,000. The two principal needs of the Cebu quarantine station at present are a new boarding vessel and an electric-light plant. As most of the buildings on the station are of wooden construction, the use of kerosene lamps is a fire menace, which it is hoped to eliminate in the near future.

Forty vessels arrived at Cebu direct from neighboring infected ports during the year. Plague is probably the greatest menace to this port from these sources. Routine inspection of all docks and vessels moored thereto is made twice daily for the enforcement of the regulations relative to the use of rat guards and other antiplague requirements. There are no floats or fender piles at the docks of this port to fend off vessels the required distance of 4 feet from the dock. This matter has been taken up with the Bureau of Public Works and the expenditure necessary for the installation of fender piles has been approved.

Iloilo.—United States quarantine station, Iloilo. Acting Asst. Surg. C. S. Gilchrist, in charge. Post office address, P.O. Box 41, Iloilo, P. I.; telegraphic address, "Quarantine, Iloilo."

The routine work of the port has been carried on throughout the year without any unusual incident. No vessels from foreign ports arrived in quarantine with quarantinable disease aboard, nor were any vessels detained for any other reason.

The following comparative tabulation shows the transactions at Iloilo during the past five years:

	1919	1920	1921	1922	1923
Vessels inspected incoming	34	46	63	47	40
Passengers and crew inspected incoming	1,886	2,560	4,237	2,495	1,788
essels fumigated	210	258	249	251	187
ills of health issued	77	103	168	149	131

The quarantine service maintains an office in the customhouse at Iloilo, and boarding is by means of the steam launch *Mariveles*. There is no detention station and at present no facilities for the bathing of personnel or the disinfection of bedding, clothing, and baggage. The quarantine service owns a small piece of ground at Iloilo and has on hand a steam chamber to set up as soon as funds are provided for building a small station and wharf. This matter will be studied during the current fiscal year and plans drawn for the proposed improvements.

The principal need of the Iloilo station, aside from the building and dock above referred to, is a new boarding vessel. The steam launch *Mariveles* has been in use since Spanish times, and its speed is now only 5 miles an hour. It is not economical to operate on account of the high cost of repairs due to its age and poor condition. Steps are being taken to replace this boat with a motor launch during the next fiscal year.

Jolo.—United States quarantine station, Jolo. Acting Asst. Surg. B. M. Panganiban, in charge. Post-office address, United States quarantine officer, Jolo, P. I.; telegraphic address, "Quarantine officer, Jolo."

The quarantine service has no station nor equipment at Jolo. The office is in charge of a part-time acting assistant surgeon paid on a fee basis, and boarding is done by utilizing the customs launch. Fumigation is by sulphur only.

The following comparative tabulation shows the transactions at Jolo during the past five years:

	1919	1920	1921	1922	1923
Vessels inspected incoming	36	46	55	39	40
Passengers and crew inspected incoming	2,223	3,490	4,246	3,352	3,612
Vessels fumigated	0	0	2	0	0
Bills of health issued	45	46	55	39	40

Zamboanga.—United States quarantine station, Zamboanga. Acting Asst. Surg. R. L. Tebbitt, in charge. Post-office address, Petitt Barracks, Zamboanga, P. I.; telegraphic address, "Quarantine officer, Zamboanga, P. I."

The quarantine service maintains only an office at Zamboanga, there being no detention station nor floating equipment provided. The office is under the charge of a part-time acting assistant surgeon paid on a fee basis. Boarding is done by utilizing the customs launch, and the quarantine service has no facilities available for fumigation of vessels, the bathing of ship's personnel, or the disinfection of clothing and baggage other than such as might be available from the Army hospital, the medical officer in charge of which acts as quarantine officer. Zamboanga is also an extremely important port by reason of the fact that passenger liners run from Singapore via Sandaken and Zamboanga to Japan, thus linking Zamboanga directly with plague ports. Additional funds have been requested in the 1924 budget for this port, and if possible a half-time officer will be placed there.

The following comparative tabulation shows the transactions at Zamboanga during the past five years:

	1919	1920	1921	1922	1923
Vessels inspected incoming	54	21	24	24	34
Passengers and crew inspected incoming	5,496	3,077	3,194	2,845	4,033
Vessels fumigated	0	0	1	0	0
Bills of health issued	58	21	24	24	55

Cavite.—United States quarantine station, Cavite. Acting Asst. Surg. Theodore E. Cox, in charge. Post-office address, c/o United States naval station, Cavite; telegraphic address, "Quarantine officer, Cavite."

The service activities at Cavite are confined to a boarding office under the charge of a part-time acting assistant surgeon, who is also a naval officer and serves without compensation, for the reason that the Cavite station is maintained as a convenience to the Navy. Such fumigation work as is required which can not be supplied by the Navy is done at Manila.

The following comparative tabulation shows the transactions at Cavite during the past five years:

	1919	1920	1921	1922	1923
Vessels inspected incoming	13	21	34	44	29
Passengers and crew inspected	1,077	2,307	3,818	5,729	3,785
Vessels fumigated	0	0	2	0	1
Bills of health issued	9	14	34	44	29

One case of leprosy arrived at the port of Cavite during the year. This was a case transferred from Guam for isolation to the Culion leper colony at Culion, P. I.

Olongapo.—United States quarantine station, Olongapo. Post-office address, United States quarantine officer, United States naval station, Olongapo, P. I.; telegraphic address, "Quarantine officer, Olongapo."

There were no transactions at the port of Olongapo during the year under report, but a comparative tabulation follows, showing the transactions at this port during the past five years:

	1919	1920	1921	1922	1923
Vessels inspected incoming	10	3	3	2	0
Passengers and crew inspected incoming	1,614	133	276	195	0
Bills of health issued	8	3	1	2	0

This station is under the charge of a part-time acting assistant surgeon, who is also a naval officer and serves without compensation. The station is maintained for the convenience of the Navy, since Olongapo, like Cavite, is not a regular port of entry.

OPERATIONS OF THE SERVICE IN HAWAII.

Surg. E. A. Sweet, chief quarantine officer, submits the following report:

Substations are maintained at the ports of Hilo, Mahukona, Koloa, Ahukini, Lahaina, and Kahului.

The fiscal year has been characterized by the remarkably low incidence of communicable diseases on arriving vessels, as well as the infrequent occurrence of quarantinable infections. Only two of the diseases subject to quarantine have been noted, leprosy and smallpox. Of the three cases of the former, two were in persons traveling to their homes under prescribed regulations, while the third, a resident of California who had heard encouraging reports of the treatment of leprosy in Hawaii, was discovered during the routine quarantine inspection of steerage passengers. Three cases of smallpox, all on different vessels, were recorded at ports of call, but insasmuch as the incubation period had passed before the arrival of the vessels at Honolulu without the development of secondary cases no further measures other than careful inspection were required.

Compulsory vaccination, previous to embarkation, of all steerage passengers from the Orient has been continued as heretofore, frequent inspections having been made during the year to determine compliance with this requirement. In only a few instances have passengers been detected who had not been successfully vaccinated.

The general health conditions on trans-Pacific vessels have shown a noticeable improvement during the year. The only serious infection with which ships' surgeons have been obliged to cope has been pneumonia, and this has largely been confined to infants of steerage passengers. Both the incidence of this disease and the resulting mortality have decreased considerably since last year. Beri-beri has been frequently observed, but it is interesting to note that practically all of the cases are among Japanese seamen, with a limited number of Filipino immigrants affected. The only epidemic condition noted was measles, on the U. S. Army transport *Grant*, with 49 cases occurring en route from New York to Honolulu.

DISINFECTION OF VESSELS.

Of the 40 vessels disinfected or fumigated during the year, 31 were treated at Honolulu, 8 at Hilo, and 1 at Kahului. In 2 instances disinfection was for leprosy, while 2 of the fumigations were done at the request of agents for the destruction of vermin. Of the 36 remaining fumigations, 10 were for the destruction of mosquitoes, and 26 for rodents, a total of 405 rats having been obtained. Pending such time as arrangements can be made for inaugurating the new method of fumigation by cyanogen chloride, the station has continued to use, without untoward results, hydrocyanic-acid gas, although in a small proportion of vessels, owing to the dangers involved, resort to sulphur has been necessary.

NEW EQUIPMENT.

Near the close of the fiscal year the station was provided with a new 60-foot launch, the *H. A. Stansfield*, equipped with a 65-horsepower heavy duty engine, to replace the *Oahu*, which has

rendered excellent service for more than 20 years. It is believed that the new launch will meet the necessary requirements, including sufficient power, ease of handling, and staunchness; but slight alterations in her deck arrangements will probably be necessary in order to suit her for duty in a subtropical climate.

Owing to the inadequacy of berthing facilities for floating equipment, certain changes in the quarantine wharf were effected in order to accommodate the new launch. These alterations were more or less of a temporary character and were instituted at relatively slight expense. It is believed that provision should be made in the near future for a permanent boat landing of stable construction at a satisfactory location. The present site is not only insanitary, owing to the large collection of oil, garbage, and harbor wastes, but it offers a serious hazard from fire.

COOPERATION WITH OTHER ORGANIZATIONS.

In December, 1922, a case of diphtheria was discovered among the crew of the Coast Guard cutter *Mojave*. Owing to close association of the enlisted force, it was deemed advisable to immunize the entire personnel, consisting of 70 men, and such action was accordingly taken on the day the diagnosis was established. Subsequently a second case was detected, and bacteriological examination made at this time showed 20 positive cultures. The men were isolated at the quarantine station and treated with sour milk sprays. After a week's treatment practically all of the patients showed two negative cultures and were returned to duty as released. No further cases developed. The seaman responsible for the outbreak was a carrier who had given rise to diphtheria on a previous occasion. Negative cultures were obtained only after his tonsils, which were badly diseased, had been removed.

The usual assistance rendered the territorial board of health in the preparation of culture media has been continued, that organization furnishing the material and our laboratory doing the work. The station crematory has also been placed at the disposal of the board of health for the disposal of the dead, seven bodies having been cremated during the year.

LAND ALTERATIONS.

On January 16, 1923, the Attorney General of the United States rendered a decision establishing the jurisdiction of the War Department over certain lands previously controlled and occupied by the Public Health Service. These lands, mostly covered by water at high tide, constituted an integral part of the quarantine station, and surrounding, as they do, both the quarantine wharf and the detention barracks, are necessary, not only for proper isolation of suspects, but also in the handling of infected vessels. The commercial development of this area, which seems inevitable, will seriously handicap quarantine operations and ultimately will doubtless require the transfer of the station to other grounds unless provision can be made for more ample protection.

PLAGUE PRECAUTIONARY MEASURES.

The plague operations of the territorial board of health, in cooperation with this service, have continued on the previous basis, the num-

ber of trappers, four, remaining the same. Requests for assistance in the destruction of rodents by householders have been received in greater number than formerly. While it is not, in all cases, feasible to detail an employee to investigate rodent complaints, owing to the distance to be traveled, advice is always given. Stress is laid upon the habits of rodents encountered, particularly their tree-climbing proclivities, and simple methods of rat proofing are described. The construction of the majority of the houses of Honolulu is such that rat proofing is a comparatively easy matter.

The total number of rodents taken in Honolulu during the fiscal year was 10,297. Of these, 2,445 were *Mus alexandrinus;* 1,249 *Mus rattus;* 1,402 *Mus norvegicus;* 5,021 *Mus musculus;* 51 mongooses; the remainder, 129, being unclassified. None was found to be plague infected.

A sharp recrudescence of both human and rodent plague on the Hamakua coast of the island of Hawaii was noted during the year. From July 4 to October 20, 1922, 12 human cases developed, all terminating fatally, and 23 rodent infections were recorded during the 12 months' period ending June 30, 1923. Some slight extension of the infected area is apparent. The nature of the terrain is such, and other handicaps are of so serious a nature, that the efforts of the territorial board of health in eradicating the infection are disappointing, in spite of the fact that preventive measures have been intensified. The number of rodents exterminated totaled 183,445, classified as follows: *Mus alexandrinus*, 12,306; *Mus norvegicus*, 20,898; *Mus rattus*, 42,459; *Mus musculus*, 80,106; mongooses, 1,113; unclassified, 26,563. The territorial board of health has recently completed a laboratory, with incinerator facilities, at Hilo, where all rodents are examined.

Summary of transactions, Hawaiian Islands.

	Honolulu.	Hilo.	Mahukona.	Kahului.	Lahaina.	Koloa.	Ahukini.
Vessels arriving	602	37	2	4	4	5	1
Inspected and passed	551	37	2	3	4	5	1
Boarded and passed	39						
Fumigated and passed	12			1			
Members of crew inspected	68,958	3,597	49	138	129	132	13
Passengers inspected	89,753	2,350			1		

OPERATIONS OF THE SERVICE IN PORTO RICO.

Surg. D. E. Robinson, chief quarantine officer, in charge. Post-office and telegraphic address, San Juan, P. R.

Scope of work.—While the service operations in Porto Rico pertain primarily to national quarantine, the duty of examination and treatment of beneficiaries of the Veterans' Bureau has added greatly to the work here. Service activities also include the relief of sick and disabled American seamen, the medical inspection of arriving aliens, and miscellaneous duties.

Personnel.—The personnel of the service at San Juan and subports of Ponce, Mayaguez, Arecibo, Aguadilla, Guanica, Humacao, Arroyo, Fajardo, and Aguirre comprised the following: Chief quarantine officer, 1 commissioned medical officer (R.), 12 acting assistant sur-

geons, 5 consultants, 6 clerks, and 30 attendants. This was reduced by two clerks before the fiscal year ended.

Operation and equipment.—A fully equipped quarantine station, including disinfecting apparatus, detention, bathing, and boarding facilities, is maintained at the port of San Juan, capable of caring for 200 passengers and crew. Acting assistant surgeons stationed at the various subports board and inspect vessels, issue bills of health, and examine arriving aliens.

National quarantine.—No cases of quarantinable disease arrived at San Juan or subports during the year. For the island population the only quarantinable disease reported was leprosy. Three persons afflicted with this disease were discovered and removed to the colony on Cabras Island.

Repairs and improvements.—The greatest need of the station at present is a small marine way in order that the station force may clean and repair the launches at regular intervals without incurring the expense incident to having the work done on the beach at Cataño.

Medical inspection of aliens.—The work of examining and treating aliens was greatly handicapped by the lack of detention and hospital facilities, but the examination was carried on as well as possible aboard the vessels.

Venereally infected alien seamen could not be removed from the vessels for treatment, but were certified and permitted to remain aboard under a segregation guaranty by the master.

Summary.

Total inspections made:	
Of vessels	197
Of members of crews	9,057
Of passengers	528
Vessels fumigated:	
Cyanide gas	7
Sulphur dioxide	9
Combined (cyanide and sulphur dioxide)	13
Total	29

PROGRESO, YUCATAN, MEXICO.

Acting Asst. Surg. H. E. Gimler, in charge.

During the fiscal year ending June 30, 1923, this station was concerned with the inspection of passengers and crews embarking from this port for ports in the United States and the fumigation, for the destruction of mosquitoes, of all vessels sailing from this port for southern ports in the United States during the closed quarantine season.

A semimonthly report was submitted regarding the prevalence of *aedes egypti*, the work for the extermination of mosquitoes, and weather conditions.

No cases of yellow fever were reported in this district during the year.

SHANGHAI, CHINA.

Acting Asst. Surg. S. A. Ransom in charge.

During the fiscal year ended June 30, 1923, the quarantine work performed at this station increased very materially over that of the

preceding year, and showed a very remarkable increase in activities over any previous years.

Fifty-four cases of illness were investigated during the year, one case being smallpox from Hongkong among the steerage of the S. S. *Tenyo Maru*, which, together with contacts, was removed to the quarantine station at Woosung and held in quarantine there. The exposed quarters were disinfected.

The disinfection of lighters was discontinued in December, in accordance with bureau letter of November 26, 1922.

Sulphur is used by this office for fumigation of vessels unless it is contraindicated by the presence of cargo which would be injured by its use.

Carbon dioxide gas has been substituted for sulphur where vessels have been partially loaded at the time of fumigation. The gas is generated from charcoal in a special apparatus and is pumped into vessels from a floating plant placed alongside. It has proved a very efficient agent for the destruction of rats. Forty-three vessels were treated by this method, with the destruction of 346 rats.

Vessels desiring bills of health to American ports are required to undergo the same treatment as previously described, viz—

[(*a*) To be fumigated when empty or when not provided with a certificate of fumigation issued within the prescribed period by an officer of the Public Health Service,

(*b*) To be inspected as near as possible to the hour of sailing, which inspection includes the examination of the personnel, the ship, and the cargo manifests. After the requirements have been met, the necessary certificates and bills of health are issued at the completion of the inspection.]

An exception as to inspection of personnel is made in the case of passenger mail steamers, which were exempted from the routine by bureau letter of January 2, 1923, and of vessels remaining at Woosung in the stream.

The local health statistics during the year under report show a very marked decrease in all diseases except cholera, which was responsible for an increase of 77 deaths, and paratyphoid and typhoid fever, in which deaths increased 13 and 63, respectively.

There has been no indication of more than a normal incidence of disease among animals.

The conditions affecting the water supply of this settlement, and incidentally the water supplied here to ships bound to American ports have not materially changed as compared with those reported last year, except that increased demand for water has led to less thorough filtration. The water is now heavily chlorinated before being admitted into the distributing main.

Morbidity and mortality in Shanghai, July 1, 1922, to June 30, 1923.

[Population: Foreigners, 20,750; natives, 814,000.]

Disease.	Number of cases among foreigners.	Number of deaths among natives.	Disease.	Number of cases among foreigners.	Number of deaths among natives.
Smallpox	20	21	Dysentery	25	62
Cholera	9	97	Measles	5	26
Typhoid fever	22	63	Paratyphoid fever	9	13
Diphtheria	38	20	Influenza	1	15
Scarlet fever	14	74	Beri-beri	0	1
Tuberculosis	29	874	Cerebrospinal fever	3	3
Plague	0	0			

NOTE.—Total deaths among foreigners, 212; among natives, 8,757. Number of rats examined, 20,256; found plague infected, none.

General quarantine transactions, Shanghai, July 1, 1922, to June 30, 1923.

Vessels passed on medical officers' certificate	110
Steamers inspected and passed	423
Steamers disinfected	74
Sailing vessels inspected and passed	0
Sailing vessels disinfected	0
Number of crew on steamers	72,603
Number of crew on sailing vessels	0
Number of passengers and steamers	49,490
Number of passengers on sailing vessels	0
Number of bills of health issued	533
Number of persons bathed	0
Number of vaccinations certified	0
Number of cases of illness on vessels investigated	54

NOTE.—Vessels disinfected by carbon dioxide (funnel gas), 43; vessels disinfected by sulphur dioxide, 31.

TAMPICO, MEXICO.

Surg. (R.) Fleetwood Gruver in charge.

With an estimated population of 80,000, Tampico is easily the most important port of Mexico. Because of its proximity to United States ports (two and one-half to five days by water and one day to Laredo and three days to El Paso territory by rail), it is, from a quarantine standpoint, the most dangerous to the southern ports of the United States when a dangerous quarantinable disease exists here.

The development of the oil industry is the large factor contributing to the growth and development of Tampico. And the development of means of communication, sections a hundred miles distant being now brought into close communication with the city, has increased its importance from the point of view of quarantine as well as from the commercial viewpoint.

Sanitary improvements have not kept pace with the commercial development of Tampico. The city lacks adequate water supply and sewerage system; there is no inspection of foods; and the health laws are only feebly enforced. Morbidity and mortality records are lacking.

Yellow fever.—On July 29, 1922, a patient in the eighth day of illness was brought into a local hospital from Panuco, a small town about 18 miles from Tampico. The patient died. Autopsy showed yellow fever. On August 21, 1922, a local case developed, and investigation showed that the patient had not been out of Tampico for over six weeks prior to his illness. As a result of this case, quarantine measures were instituted against Tampico by the United States Public Health Service August 23, 1922. Since this date there have been 10 deaths from yellow fever and 2 deaths from suspected yellow fever in Tampico. There were also 15 deaths from yellow fever of Panuco origin, and cases were reported from Tuxpam, Monterrey, Victoria, and Cacalilao during the year. The Rockefeller Yellow Fever Commission, which, together with the Mexican Government, had carried on an antimosquito campaign from 1920 to June, 1922, (at which time the mosquito index was low and the work was turned over to the Mexican health authorities), again resumed its campaign to eradicate the yellow fever bearing mosquito. During the six weeks that the work had been turned over to the Mexican authorities, the *Aëdes* (*Stegomyia*) index had increased from less than 5 per cent to over 20 per cent, and, in certain sections of the city, to over 40

per cent. Since the resumption of the work by the commission, during which time intensive operations have been carried on, the mosquito index has been greatly reduced, being, on June 30, 1923, for the city, 1.05, although some sections showed an index as high as 7. Until permanent sanitary improvements are made, adequate water supply and a sewerage system are secured, and reliable morbidity and mortality reports are developed, Tampico must be regarded as a port in which yellow fever exists or is suspected to exist.

Bubonic plague.—During the year there were two deaths reported from bubonic plague, both occuring in children in a section of the city close to the water front in which infected rodents had been captured. Rodent plague is of frequent occurrence, the last reported during the fiscal year ended June 30, 1923, being on April 20. Other than trapping, no measures are being undertaken to rid the city of infection.

Smallpox.—In the latter part of February, 1923, a case of smallpox in a child was discovered by a sanitary inspector of the Public Health Service in La Constitucion, an unused oil terminal situated between the properties of the Huasteca and Corona oil companies. Both companies cooperated with the health authorities to prevent the spread of the disease and instituted a vaccination campaign among their employees. In all, six cases were reported from the settlement. The infection is believed to have come from Tampico, where eight cases were recorded for the year.

Classification of terminals.—Terminals were inspected for possible bre ding places for mosquitoes, for the purpose of classifying the terminals and exempting from quarantine restrictions vessels moored at those terminals found to be free from breeding places. This had a salutary effect on the management of several oil companies, the officials of which cooperated to the fullest extent.

Economies effected.—With considerable effort, concerted action was finally secured from the various steamship companies, on the plan recommended by the Service for pooling their interests in order to avoid extortionate fumigation charges. During the fiscal year under report, 557 vessels clearing for United States ports docked at infested wharves and were fumigated. The saving under the plan proposed by the United States Public Health Service, together with the saving of demurrage by vessels lying at approved Stegomyia-free terminals (such vessels being allowed to enter southern ports without delay) is estimated at $3,000,000 for the quarantine season. Also there were docked at these wharves, 247 vessels whose regular six months' fumigation was due, requiring fumigation either here or on arrival at an American port. By request, these vessels were fumigated here, although they are not included in the estimate of savings.

TUXPAM AND PORT LOBOS, MEXICO.

Acting Asst. Surg. L. M. Taylor in charge.

Located midway between Tampico and Vera Cruz, this district exports nothing to the United States except crude petroleum. The tank vessels have suspended passenger service recently, and clearances from the district have fallen off considerably, due in part to the temporary reduced production of crude oil in Mexico and partly to the employment of the large tank fleets in the California trade.

Vessels loading at this station are anchored 1 mile off shore and take cargo through flexible pipe lines. There is seldom any communication of the crew with the shore, and when this occurs the fact is noted on the bill of health for the information of the service officer at the port of entry.

VIRGIN ISLANDS.

Surg. D. C. Turnipseed, chief quarantine officer in charge. Post office and telegraphic address, St. Thomas, Virgin Islands.

Substations are maintained at Frederiksted, St. Croix, Virgin Islands, under the direction of C. B. Van Gaasbeek, lieutenant, Medical Corps, United States Navy, and at Christiansted, St. Croix, Virgin Islands, under the direction of R. S. G. Welch, lieutenant, Medical Corps, United States Navy. Both of these officers cooperate with the chief quarantine officer in all matters relating to quarantine procedures.

At East Point, St. Thomas, Virgin Islands, there is maintained a quarantine reservation, with suitable building facilities, to be used in an emergency, should such become necessary, for isolation of personnel on account of quarantinable disease. This reservation is leased by the service from the harbor board of St. Thomas.

Although there were no quarantinable diseases on board vessels arriving in Virgin Island ports during the fiscal year, this station was concerned in taking special measures against one quarantinable disease—smallpox.

On account of the prevalence of smallpox known as "alastrim" or kaffir pox, in Santo Domingo and Haiti, and in a majority of the Windward Islands of the West Indies, the passengers and crews of all vessels from these ports have been required to be vaccinated before landing.

One British schooner and one Dominican sloop were detained in quarantine for four and three days, respectively, for observation. These vessels came direct from San Pedro de Macoris, Dominican Republic, where smallpox was reported prevalent, and some of their personnel had an elevation of temperature upon arrival. Since no cases developed during the period of incubation (14 days from port of departure), the vessels were granted pratique after the effects of all passengers had been disinfected.

Antiplague measures.—The quarantine officer cooperates with the chief sanitation officer, who is a medical officer of the United States Navy stationed at St. Thomas, in the prevention of the entrance of plague into the islands. Plague suppressive measures have been in effect here since the report of the reappearance of the disease in Porto Rico in February, 1921.

There are only two piers (besides a floating dry dock) at which steam vessels can dock in St. Thomas. From these localities during the period July 1, 1922, to June 30, 1923, 889 rats were trapped and examined macroscopically. None of these showed any evidence of plague infection.

Quarantine fees.—In accordance with an act of Congress approved July 1, 1922, all quarantine fees received by the collectors of customs at the several ports in the Virgin Islands have been turned into the treasury of the islands.

Bills of health.—During the fiscal year seven vessels were reported to the Secretary of the Treasury as having failed to produce bills of health upon arrival from foreign ports, thereby violating the act of Congress approved February 15, 1893. Because of extenuating circumstances, all except two of these cases were dismissed without penalty.

Immigration.—The United States immigration laws have not been made applicable to the Virgin Islands, consequently there have been no transactions for this service during the past fiscal year.

Repairs to property.—The usual routine repairs were made to the buildings and structures on the quarantine reservation and to the floating equipment. All appear to be in a good state of preservation.

Medical Inspection of Aliens.

During the fiscal year ended June 30, 1923, there were examined by medical officers of the United States Public Health Service 745,515 immigrants for the purpose of detecting physical or mental defects or diseases, as provided for in the United States immigration laws, as compared with 586,228 for the fiscal year ended June 30, 1922, and 1,137,682 for the fiscal year ended June 30, 1921. In addition to the immigrants examined, 826,295 alien seamen were inspected, as provided for in the act of February 5, 1917, as compared with 783,193 for the previous fiscal year, and 851,928 for the fiscal year ended June 30, 1921. The reduction in the number of immigrants examined in 1922 from that in 1921 was largely due to the application of the "3 per centum law." The accompanying tables present in detail the data relative to the inspection and certification of immigrants and alien seamen during the fiscal year under report.

67293—23——12

Alien seamen inspected and certified at all ports and places in the United States and its dependencies and in Canada.

Place.	Number of alien seamen examined.	Alien seamen certified.					Important diseases for which certification was made.										
		Class A.		Class B: Disease or defect which affects ability to earn living.	Class C: Disease or defect of less degree.	Total.	Trachoma.	Tuberculosis.	Insanity.	Idiocy.	Imbecility	Epilepsy.	Feeble-minded and psychopathic inferiority.	Favus.	Syphilis.	Soft chancre.	Gonorrhœa.
		(1) Idiocy, imbecility, feeble-minded insanity, epilepsy, and tuberculosis.	(2) Loathsome contagious or dangerous contagious disease.														
Ajo, Ariz.	0																
Baltimore, Md.	15,949	6	165	110	4	285		4	1						53	17	86
Bellingham, Wash.	0																
Biscayne Bay, Fla (quarantine)	4,414		6			6									3		3
Blaine, Wash.	0																
Boston, Mass.	59,636	4	248	228	406	886	94	2	2						32	66	56
Brownsville, Tex.	0																
Brunswick, Ga.	0																
Buffalo, N. Y.	378		3			3											
Calais, Me.	0																
Calexico, Calif.	0																
Charleston, S. C.	2,216		12	8		20									2	5	3
Columbia River, Oreg. (quarantine)	5,179		27	6	2	35									7	11	9
Columbus, N. Mex.	0																
Del Rio, Tex.	0																
Detroit, Mich.	0																
Douglas, Ariz.	0																
Duluth, Minn.	541																
Eagle Pass, Tex.	0																
Eastport, Idaho.	0																
Eastport, Me.	0																
El Paso, Tex.	0																
Fall River, Mass.	1,494		6	2		8									2	3	1
Fort Monroe, Va.	20,029	5	328	320	18	671	1	3					2		52	103	161
Freeport, Tex.	1,572		3			3									2		1
Galveston, Tex.	16,577		96	93		189	17								30	14	31
Gloucester, Mass.	403		1	5		7							1		1		

Halifax, Nova Scotia	0																	
Hidalgo, Tex	0																	
Honolulu, Hawaii	15																	
Hoquiam, Wash	1,174		19	2		21	19											
Houlton, Me	0																	
International Falls, Minn	0																	
Jackman, Me	0																	
Ketchikan, Alaska	0																	
Key West, Fla	5,199																	
Laredo, Tex	0																	
Lewiston, N. Y	0																	
Marcus, Wash	0																	
Mobile, Ala	5,265	1	26	60	6	93		1								15	2	9
Montreal, Canada	123																	
Naco, Ariz	0																	
New Orleans, La. (quarantine)	49,581			74		74												
New Orleans, La., city	5,199	2	23	4	6	35	2	1	1							11	2	7
Newport, Vt	0																	
New York, N. Y	458,656	6	201	19	22	248	42	6	3							49	29	81
Niagara Falls, N. Y	0																	
Nogales, Ariz	0																	
Ogdensburg, N. Y	639		3	9	9	21												
Oroville, Wash	0																	
Pascagoula, Miss	218																	
Pensacola, Fla	1,253	1	10	5	6	22		1								5	2	3
Perth Amboy, N. J	0																	
Philadelphia, Pa	31,649		194	60	63	317	32									60	30	72
Philippine Islands	0																	
Portal, N. Dak	0																	
Port Angeles, Wash	279																	
Port Huron, Mich	0																	
Portland, Me	6,663		18		1	19										4	1	10
Portland, Oreg	81	4	6	11	11	32	1	2								3	3	1
Porto Rico, other than San Juan	5,711	0																
Port San Luis, Calif	7																	
Port Townsend, Wash	8,749		15	8	2	25	2										6	6
Presidio, Tex	0																	
Providence, R. I	4,550		5	3	2	10										2	1	2
Quebec, Canada	0																	
Rio Grande City, Tex	0																	
Sabine, Tex	10,663	1	63	3	1	68			1							16	14	33
St. Albans, Vt	0																	
St. Johns River, Fla. (quarantine)	1,738		12	3	6	21											4	8
St. John, New Brunswick	0																	
San Diego, Calif	2,856																	
San Fernando, Ariz	0																	
San Francisco, Calif.[1]	41,958	2	59	10	1	72	1	2								2	3	10
San Juan, P. R	12,862		37	9		46										1	20	16
San Pedro, Calif	21,495	9	27	1		37		6				1				7	4	15
Sault Ste. Marie, Mich	0																	

[1] 43 cases of clonorchiasis certified at San Francisco, Calif.

Alien seamen inspected and certified at all ports and places in the United States and its dependencies and in Canada—Continued.

Place.	Number of alien seamen examined.	Alien seamen certified.					Important diseases for which certification was made.										
		Class A.		Class B: Disease or defect which affects ability to earn living.	Class Diseas or defect of less degree.	Total.	Tra-choma.	Tuber-culosis.	Insan-ity.	Idiocy.	Imbe-cility.	Epi-lepsy.	Feeble-minded and psycho-pathic inferi-ority.	Favus.	Syph-ilis.	Soft chancre.	Gonor-rhœa.
		(1) Idiocy, imbecility, feeble-minded, insanity, epilepsy, and tuberculosis.	(2) Loathsome contagious or dangerous contagious disease.														
Savannah, Ga	2,821		19	11	2	32									5	4	10
Seattle, Wash	9,390	3	221	1		225	103	3							19	5	92
Sumas, Wash	0																
Sweetgrass, Mont																	
Tacoma, Wash	1,109																
Tampa, Fla	0																
Tampa Bay, Fla. (quarantine)	3,220																
Tia Juana, Calif	0																
Tucson, Ariz	0																
Van Buren, Me	0																
Vancouver, British Columbia	1,168																
Victoria, British Columbia	3,600																
Wilmington, N. C	5																
Winnepeg, Canada	0																
Yarmouth, Nova Scotia	5																
Total	826,295	45	1,850	1,068	568	3,531	314	31	8	0	0	1	3	0	383	349	726

Aliens inspected and certified at all ports and places in the United States and its dependencies and in Canada.

Place.	Number of aliens examined.	Aliens certified.					Important diseases for which certification was made.										
		Class A.		Class B: Disease or defect which affects ability to earn living.	Class C: Disease or defect of less degree.	Total.	Trachoma.	Tuberculosis.	Insanity.	Idiocy.	Imbecility.	Epilepsy.	Feeble-minded and psychopathic inferiority.	Favus.	Syphilis.	Soft chancre.	Gonorrhea.
		(1) Idiocy, imbecility, feeble-minded, insanity, epilepsy, and tuberculosis.	(2) Loathsome contagious or dangerous contagious disease.														
Ajo, Ariz	295	9	2	2		13	2	8					1				
Baltimore, Md	152			2		2											
Bellingham, Wash	11																
Biscayne Bay, Fla. (quarantine)	4,501			1	1	2											2
Blaine, Wash	239	9	4	43	11	67		1	3			1	4				3
Boston, Mass.[1]	14,750	4	61	737	607	1,409	17	1	1				1		1	1	15
Brownsville, Tex.[2]	3,151	7	57	174	18	256	31	3			1		1		2	4	
Brunswick, Ga	0																
Buffalo, N. Y	13,769	22	4	340	55	421		1	8	1	2	3	7		2		1
Calais, Me	3																
Calexico, Calif	1,012	1	2	9		12		1									2
Charleston, S. C	4																
Columbia River, Oreg. (quarantine)	19																
Columbus, N. Mex	869		2			2									1		1
Del Rio, Texas	3,327			9	6	15											
Detroit, Mich	6,008	65	37	202	344	648	10	14	11		1	3	36		6		15
Douglas, Ariz	4,465	4	39	25	59	127	38	1				2			1		
Duluth, Minn	7,361	3	1	24	17	45		1					1				1
Eagle Pass, Tex	9,853	5	3	67	41	116	1			1		2	1				
Eastport, Idaho	4,066	7	3	102	8	120		3	1			1	2		3		
Eastport, Me	2	1				1							1				
El Paso, Tex	51,539	12	22	449	175	658	6	2	4		2	2	2	8	4		5
Fall River, Mass	4																
Fort Monroe, Va	979	3	2	7	2	14		2					1		2		
Freeport, Tex	6																2
Galveston, Tex	121		3			3											

[1] 40 cases of gonorrhœa certified at Boston, Mass.

[2] 3 cases of leprosy certified at Brownsville, Tex.

Aliens inspected and certified at all ports and places in the United States and its dependencies and in Canada—Continued.

Place.	Number of aliens examined.	Aliens certified.					Important diseases for which certification was made.										
		Class A.		Class B: Disease or defect which affects ability to earn living.	Class C Disease or defect of less degree.	Total.	Trachoma.	Tuberculosis.	Insanity.	Idiocy.	Imbecility.	Epilepsy.	Feebleminded and psychopathic inferiority.	Favus.	Syphilis.	Soft chancre.	Gonorrhea.
		(1) Idiocy, imbecility, feebleminded, insanity, epilepsy, and tuberculosis.	(2) Loathsome contagious or dangerous contagious disease.														
Gloucester, Mass.	5																
Halifax, Nova Scotia	8,324	11	2	48	89	150	1	5				2	1				
Hidalgo, Tex.	27,388	1	9	1		11	9						1				
Honolulu, Hawaii [3]	4,112	3	5	68	20	96	1	1	2						1		1
Houlton, Me.	64	3		1		4		1					2				
International Falls, Minn.	713	6	1	57	4	68		1	2				3				
Jackman, Me.	417	4		19	42	65							4				
Ketchikan, Alaska	1,725																
Key West, Fla.	7,550	1	1	10		12	1	1									
Laredo, Tex. [4]	21,710	21	151	273	143	588	95	11	2			1	6			13	20
Lewiston, N. Y.	484	1		10	7	18			1								
Marcus, Wash.	750			15	7	22											
Mobile, Ala.	68																
Montreal, Canada	31,516	92	124	1,833	781	2,830	67	24	15	4	3	4	40	2		1	52
Naco, Ariz.	2,823	2	20	5	5	32	17			1			1		1		
New Orleans, La. (quarantine) [5]	3,524	2	1	23	0	26		2									
New Orleans, La. (city)	415	3	4	6	6	19	2	2	1								
Newport, Vt.	5,350	9	6	128	120	263		1	1			2	5		1		
New York, N. Y. [6]	371,608	138	580	10,172	6,875	17,765	134	63	25	4	8	1	37	10	56	38	144
Niagara Falls, N. Y.	4,082	19	7	79	72	177	2	8	1			3	7	1			1
Nogales, Ariz.	15,922	10	54	36	4	104	50	8					2		4		
Ogdensburg, N. Y.	115	8		17	13	38		4	2				2				
Oroville, Wash.	336	1	1	5	5	12							1				1
Pascagoula, Miss.	1																
Pensacola, Fla.	0																
Perth Amboy, N. J.	0																
Philadelphia, Pa.	3,340	8	23	52	15	98	18	2				2	4	1	1		3
Philippine Islands	6,538		32			32	1							31			

Portal, N. Dak.	542	7	2	49	1	59		1	3				3				
Port Angeles, Wash.	0																
Port Arthur, Tex.	0																
Port Huron, Mich.	2,456	48	3	188	74	313	2	3	9		2		31				
Portland, Me.	119				3	3											
Portland, Oreg.	98	2		33	14	49		1					1		1		1
Porto Rico, other than San Juan.	373																
Port Townsend, Wash.	1,959		1	2	1	4	1										
Presidio, Tex.	9,044	1	1			2		1							2	1	2
Providence, R. I.	3,497	2	30	35	44	111	29		2				4				
Quebec, Canada.	10,904	7	6	129	23	165					1	2			2		2
Rio Grande, Tex.	203		9	5		14	4										
Sabine, Tex.	0																
St. Albans, Vt.	890	17	1	47	29	94		3	2		2	2	8		1		
St. Johns River, Fla. (quarantine)	0																1
St. John, New Brunswick.	6,965	12	1	168	86	267		2					10				1
San Diego, Calif.	106		1	1		2											
San Fernando, Ariz.	150	1				1		1									
San Francisco, Calif.[7]	14,196	5	118	169	177	469	7	1	3				1		1	1	3
San Juan, Porto Rico.	6,936		4	26		30	4										
San Pedro, Calif.[8]	2,414	6	1	1		8		2									
Sault Ste. Marie, Mich.	2,961	1		7	25	33			1								
Savannah, Ga.	56																
Seattle, Wash.[9]	2,306	6	113	292	8	419	31	2	3			1				1	7
Sumas, Wash.	714	11	46	145	0	202	32	10					1		8		6
Sweet Grass, Mont.																	
Tacoma, Wash.	49		1	1		2	1										
Tampa, Fla.	3,639	1	4	1	1	7	3						1		1		
Tampa Bay, Fla. (quarantine).	160																1
Tia Juana, Calif.	1,934		5		1	6	4										
Tucson, Ariz.	253	9	76	7		92	37	7					2		30		9
Van Buren, Me.	134	1	1	7	9	18		1									
Vancouver, British Columbia.	3,244	14	11	107	15	147	4	5	3	1			5		3		
Victoria, British Columbia.	3,772	8		25	45	78		4	2		1						
Wilmington, N. C.	0																
Winnipeg, Canada.	17,220	30	11	655	48	744	7	19				6	5		2		1
Yarmouth, Nova Scotia.	2,835		1	7	17	25									1		1
Total.	745,515	684	1,710	17,158	10,173	29,725	669	235	108	12	23	41	245	53	138	60	304

[3] 2 cases of clonorchiasis certified at Honolulu, Hawaii.
[4] 2 cases of leprosy certified at Laredo, Tex.
[5] 1 case of leprosy certified at New Orleans, La. (quarantine station).
[6] 55 cases of clonorchiasis certified at New York, N. Y.
[7] 106 cases of clonorchiasis certified at San Francisco, Calif.
[8] 1 case of clonorchiasis certified at San Pedro, Calif.
[9] 73 cases of clonorchiasis certified at Seattle, Wash.

Reports from Immigration Stations.

AJO, ARIZ.

Surg. O. B. Patton in charge.

Most of the aliens examined at this office are Mexicans, principally from the rural districts of Sonora, with little opportunity of spreading acute infectious diseases, except tuberculosis.

ASTORIA, OREG.

Surg. H. M. Manning in charge.

Alien crews were subject to venereal inspection during the fiscal year at the request of the Immigration Service, resulting in a considerable increase in the number certified for this class of diseases. Recently there has been a decided decrease in the number of cases of venereal diseases among seamen entering this port.

BOSTON, MASS.

Acting Asst. Surg. A. J. Nute in charge.

Boston has resumed a fairly normal traffic of first, second, and third class passengers, partly as a port of termination and partly as a port of call. Eight passenger lines maintained regular service, and, beginning July 1, 1923, two additional lines are scheduled to make this a port of entry. Owing to the quota law, a certain proportion of the ships divide their passenger and freight service with other ports, such as Halifax, New York, and Philadelphia. There has been a distinct decrease in the number of Mediterranean immigrants and a marked increase in the number of aliens from the British Islands and northwestern Europe.

Personal cleanliness has been noted in comparison with former years; rarely did any alien show evidence of head or body lice. The few cases found were mostly among detained aliens brought from subports. For the first year in many years no active cases of ringworm or favus of the scalp and nails were found. The delousing system practiced at some of the ports of embarkation, together with the quarantine procedure upon arrival at Boston, has proved of value, not only in keeping out typhus but in reducing the number of serious parasitic diseases of the skin presented.

Aliens in the first class have been inspected on board ship. As a rule, aliens in the second and third class, after being separated from the United States citizens, have been inspected on the piers when conditions permitted.

Over 10 per cent in the cabin were certified for various defects, as compared with about 5 per cent in the steerage. This proportion indicates the importance of careful cabin inspection. Detained aliens requiring special examination are taken to the immigration station in East Boston, as there are no docks in Boston equipped for this work. This condition is not satisfactory, but is probably the best that can be obtained with limited personnel and port facilities. With the limited medical staff, the efficiency of the medical inspection on the docks depends, to an important degree, upon the assistance and cooperation of the Immigration Service. At present, aliens turned

off from the primary inspection line are guarded mainly by steamship stewards and stewardesses because of the limited number of immigration employees.

To check escapes or oversight, immigration inspectors have been constantly encouraged to return to the medical examiners aliens who show any physical or mental peculiarities, who have any difficulty trying to read, or who may be apparently normal but have at some previous time been in a hospital. The test card and manifest questions have, properly handled, given clues that would be impossible to obtain by any system of line inspection on ships or piers.

Although the quota system decreased the number of aliens arriving legally into the United States, there has been a distinct increase in the number arriving at Boston, and the additional work is reflected by the high percentage of medical certificates issued.

Whether coincidence or not, since the World War and the literacy test went into effect, there has been a distinct decrease in the number of arriving mental defectives. On the other hand, tuberculosis suspects have had a slow but steady increase. Owing to the legal nature of a medical certificate plus the difficulty of positive diagnosis in early stages, tuberculosis is one of the most difficult problems at present.

Work under pressure has steadily increased, particularly on Sundays, holidays, early in the morning, and late in the evening, with no overtime allowance. Without adequate time for recreation and improvement, there is a tendency for morale and efficiency to be undermined. In consequence, recommendation has been made for at least one more medical officer for duty at this station.

The effect of a thorough examination of arriving orientals resulted in a sharp decline in the number of applicants for admission of the nonexempt class. Out of 169 Chinese presented for examination, 35 were found to have clonorchiasis, 39 had hookworm, and 60 had either *Ascaris*, *Trichuris*, *Hymenolepis nana*, *Strongyloides*, or malaria. Several cases of clonorchiasis ordered deported were taken before the United States court in February, 1922, on writs of habeas corpus. The cases were taken under advisement and in June a decision was rendered in favor of the Government.

General conditions relative to the immigration building remain about the same as outlined in the last report. Aid to the Immigration Service other than that authorized by law has been extended during the year with a view of preventing disease in the detention quarters. Fortunately there has been no overcrowding and no epidemic outbreak. The usual percentage of acute bronchial infections and tonsillitis cases associated with climatic influences and lack of outdoor exercise caused most of hospital admissions. A few cases of mumps, measles, scarlet fever, and diphtheria occurred, but were promptly detected and no serious results followed. Two hundred and ninety-seven persons were admitted to the hospital, with four deaths. At the close of the year six patients remained in hospital. The persons who died in detention were seriously sick at the time of their arrival and transfer from ship to hospital. Following were the causes of death: Pneumonia, 2; pellagra, 1; septic endocarditis, 1.

Inspection of crews included not only the port of Boston but the subports of Lynn, Salem, Beverly, Quincy, Weymouth, and Plymouth. Special examinations made of 26,782 persons disclosed 154

infected with venereal diseases and 94 cases of trachoma. The Marine Hospital has cared for these cases in a very satisfactory manner. All the local hospitals handling alien patients have extended every courtesy and cooperation to the service. Because of the large number of deserting seamen, inspection of this class has become as important as passenger inspection. One hundred and forty-three stowaways were reported and given careful physical examination. The majority presented for examination were healthy males in the prime of life endeavoring to get to the United States on account of economic conditions in their homelands.

By special authority of the Immigration Bureau, an unusually large number of Canadians have been presented at this office for examination during the last six months to legalize their entry into the United States.

The diverse nature of duties, boarding ships, supervision of hospital cases, laboratory tests, oversight of detention quarters, reexamination of both detained and landed aliens keeps the present staff busy regardless of incoming quota of aliens for primary inspection. From information at hand it is expected that the next fiscal year will have a greater number of aliens arriving in this district than in the past year.

Some improvements have been made in the offices furnished the Public Health Service by the Immigration Bureau, so that they are more appropriate for the purpose intended. The location and facilities of the immigration building do not favor either economy or efficiency of administration.

It is desired to acknowledge the courtesy and cooperation extended by the Commissioner of Immigration and his assistant.

BROWNSVILLE, TEX.

Acting Asst. Surg. G. D. Fairbanks in charge.

The work of the medical examination of aliens during the past year has been of the same character as usual, except that in recent months great numbers of Europeans have applied for admission. These are not shown on the record of aliens admitted and inspected, which numbered 3,151 this year, 256 of whom were certified for some physical defect. The number of gynecological examinations made for the Immigration Service was 32, and the number of sick aliens visited at the jail was 28, both of which was a large increase over last year.

CALEXICO, CALIF.

Acting Asst. Surg. A. L. Rice in charge.

During the summer of 1922 there was an epidemic of smallpox at Mexicali, a border town opposite Calexico. Approximately 200 cases were reported at one time.

Under authority of the Surgeon General, and in conjunction with the State board of health and the city health board, a rigid quarantine was established and put into effect June 3, 1922. All persons crossing the international boundary line who had not had smallpox were required to be vaccinated and present their vaccination certificates at every crossing. This quarantine was in effect to the end of the fiscal year.

Approximately 2,000 persons were vaccinated on each side of the border.

DEL RIO, TEX.

Acting Asst. Surg. H. B. Ross in charge.

During the year the ferry which was formerly used in crossing the Rio Grande was replaced by an international bridge.

DOUGLAS, ARIZ.

Acting Asst. Surg. E. W. Adamson in charge.

Douglas, Ariz., is a port of entry for a portion of the State of Senora, Mexico. The major portion of aliens applying are residents of the various mining towns along the Nacozari Railroad, which penetrates to a point about 80 miles below Douglas, Ariz. These aliens usually come for trading only and are usually in good health. They are almost universally vaccinated against smallpox by the company surgeons, except those who have acquired immunity by having the disease. Typhoid is rare and typhus has never been seen here. The aliens from the surrounding agricultural and ranch districts are not so well looked after in regard to their physical welfare, and trachoma prevails among the emigrants from one section.

DULUTH, MINN.

Acting Asst. Surg. E. L. Cheney in charge.

During the past few years the standard of aliens entering at this port has improved both physically and mentally, a matter of importance, to the country at large and this vicinity in particular.

EASTPORT, IDAHO.

Acting Asst. Surg. Nathanel L. A. K. Slamberg in charge.

The exodus from Canada during the first months of the calendar year has been remarkable. As a rule, the immigration to the United States has been most pronounced in the autumn, but in 1923 this condition has been reversed. Apparently, a series of dry years has tended to discourage many settlers.

EL PASO, TEX.

Passed Asst. Surg. J. W. Tappan in charge.

Immigration at this port, as heretofore, has been chiefly Mexican, largely on account of the clause in the immigration law which prohibits Europeans from entering through Mexico except after a residence of two years in that country. Those who were presented were closely examined, particularly for affections known to prevail in southern Europe. The Mexican immigration was unusually heavy during the spring months on account of the demand for labor.

Aliens held in detention at the immigration station are given medical attention and general hygienic supervision. They are bathed weekly, and their clothing and bedding are disinfected at the quarantine station.

HOULTON, ME.

Acting Asst. Surg. E. C. Bates in charge.

The work at this station during the fiscal year ended June 30, 1923, increased considerably over that of last year. The cases passed

upon are nearly all of persons living near the border, and of sound and robust physical condition, being mostly farmers and laborers and their families.

KEY WEST, FLA.

Acting Asst. Surg. J. Y. Porter, jr., in charge.

All medical inspections at this port are made on the vessels, as there are no facilities for examinations ashore. During the winter months, owing to the late arrival of the boats, inspections are occasionally made after sunset and, consequently, with the aid of poor artificial lighting.

Alien crews on regular passenger vessels are inspected.

MONTREAL, CANADA.

Surg. E. H. Mullan in charge.

A number of persons who apply for admission to the United States at Montreal are visitors and remain in the United States for short periods. In some instances medical certificates are issued two and three times for the same person in the same year.

During the past year it has been found necessary, for administrative purposes, to return to the issuing of certificates for pediculosis

Beginning July 1, 1923, visual defects (from refractive errors) amounting to more than 20/100, if uncorrected by glasses, will be certified in class B.

At the request of the American consul general, physical examinations prescribed by the Commissioner of Pensions have been made in the case of 14 veterans of the Civil and Spanish-American Wars.

Application for an additional room for this station has been made. This room, if obtained, will be used for an office as well as a place in which special examinations may be conducted.

NACO, ARIZ.

Acting Asst. Surg. B. C. Tarbell in charge.

The increase in the number of aliens applying for admission at this port for the fiscal year under consideration over the previous two years is due to the reopening of the Cananea Copper Co. mines in the northern part of Mexico. This company employs several thousand Mexican laborers.

Most of the Mexican aliens applying for admission at this port are found to be free from disease, since the general health in the northern part of Sonora, whence they originate, is good.

There has been but one case of smallpox in Cananea, Mexico, this year, due to the fact that over 15,000 persons were vaccinated by the mining company and city health authorities.

During the year several hundred aliens were vaccinated against smallpox at this station.

NEW ORLEANS, LA.

Acting Asst. Surg. J. T. Scott in charge.

The majority of alien passengers coming through this port were not immigrants but tourists and people from the Tropics coming to New Orleans on business.

The inadequate equipment of this station has resulted in a considerable amount of dissatisfaction on the part of persons detained

at the station as well as those interested in shipping. Patients should not be sent here for treatment but to the Marine Hospital, where they will receive not only the proper treatment but the necessary nursing.

Street-car service on the Algiers side of the river is uncertain and unsatisfactory, delays being the rule.

NEW YORK, N. Y.

Surg. W. C. Billings in charge.

This is the second year of the application of the "quota law." Since the provisions of this law permit the presentation of 20 per cent of the annual total allowed each country each month, transportation companies endeavor to land their passengers as near the first of the month as possible in order to avoid the possibility of the aliens being in excess of the quota. This action on their part is perhaps to be expected in view of the penalties imposed for failure to get within the quota; but the result, as far as the medical division of this station is concerned, is extremely embarrassing from an administrative standpoint. The procedure resolves itself into a situation where the great bulk of the monthly work is crowded into the first few days of the month, during which the medical division finds itself most seriously understaffed—so much so that considerable adjustment is necessary to meet what is a distinct emergency. Some of these expedients are far from desirable, but under the circumstances they seem to be unavoidable. This intensely congested period of the first few days of each month is necessarily followed by a reaction in the latter two-thirds of the month, during which time the division is overstaffed. The personnel of the division is highly specialized; therefore their number must remain fairly constant, and we must accept the unsatisfactory division of work, with the accompanying differences in its execution, as a necessary result of an unfortunate method of landing aliens.

Throughout the last fiscal year "intensive" examinations have been continued and have been made to the maximum capacity of the personnel. Here again is exhibited one of the disadvantages resulting from overtaxing our resources in the first few days of the month. When it is necessary to examine an inordinately large number of arrivals in any one day, it is obvious that the number of "intensive" examinations must be reduced and the number of "routine" examinations proportionately increased. Notwithstanding the difficulties present during the last fiscal year, intensive examinations were made of 61.28 per cent of all alien steerage. In the opinion of the chief medical officer, the value of this form of examination over the "routine" method can not be too strongly emphasized, and to obtain the best results the station should be supplied with sufficient personnel and sufficient and properly equipped examining rooms to permit of the application of this method to all arrivals.

The percentage of arrivals with pediculosis presenting themselves at Ellis Island has been markedly decreased, with a corresponding diminution in danger from typhus fever.

In general, the types of disease presented and the variation in the percentages of those afflicted with certain diseases have not varied greatly from those of former years.

The percentage of certificates issued against alien passengers during the past two years is as follows:

Class.	Per cent.	
	1922	1923
A-I	0.048+	0.038
A-II	.175+	.156
B	3.97	2.50
C	1.73	1.85

In the boarding section two medical officers have been continued on duty at the quarantine station to inspect crews of nonpassenger-carrying vessels. As arranged at present, this detail is not considered by the chief medical officer to be entirely satisfactory.

During 1923 the hospital section has operated as United States Marine Hospital No. 43; and in all matters connected therewith the Immigration Service has, as far as possible, extended hearty cooperation.

Aid to the Immigration Service, other than that prescribed by law, in the nature of professional advice, medical treatment to employees becoming ill on duty, visits to the homes of employees absent on account of night inspection of detained immigrants, physical examinations of new employees, etc., has been routine practice during the year, and the station has extended aid to merchant seamen, the Coast Guard, and the United States Employees' Compensation Commission.

Appended hereto are reports showing in detail the work and the results of the year's activities.

Disposition of immigrants certified.

Class A (1):	
Cases pending at beginning of year	17
Cases certified during year	138
Total to be accounted for	155
Cases deported	116
Cases landed	34
Cases pending close of year	5
Class A (2):	
Cases pending at beginning of year	48
Cases certified during year	580
Total to be accounted for	628
Cases deported	437
Cases landed	155
Cases pending close of year	36
Class B:	
Cases pending beginning of year	62
Cases certified during year	10,172
Total to be accounted for	10,234
Cases deported	438
Cases landed	9,697
Cases pending close of year	99
Class C:	
Cases pending at beginning of year	18
Cases certified during year	6,875
Total to be accounted for	6,893
Cases deported	96
Cases landed	6,761
Cases pending close of year	36

Race of aliens certified for mental condition during fiscal year ending June 30, 1923.

Race.	Mental condition.						Total.
	Insanity.	Moron.	Idiocy.	Imbecility.	Epilepsy.	Mental deficiency.	
African (black)	1	2					3
Canadian	1						1
Dutch	1	1					2
English	2		1			1	4
French		1		1			2
German	4	2		2	1		9
Greek	1						1
Hebrew	2	13		5		4	24
Irish	4	6					10
Italian (South)	2	6	2				10
Lithuanian	1					1	2
Polish	3						3
Rumanian	1						1
Scandinavian	2						2
Scotch			1				1
Total	25	31	4	8	1	6	75

Nativity and race of immigrants certified for trachoma during fiscal year ending June 30, 1923.

Nativity.	Race.																						Total.	
	Armenian.	Arabian.	Assyrian.	Bulgarian.	Finnish.	German.	Greek.	Hebrew.	Hindoo.	Irish.	Lithuanian.	Mongolian.	Magyar.	Mexican	North.	Polish.	Rumanian.	Russian.	Scotch.	Scandinavian.	Syrian.	Slovak.	South.	
Austria						4																		4
Armenia	6																							6
British East Indies									1															1
Bulgaria				1																				1
China												6												6
Czechoslovakia																						2		2
Finland					1																			1
France		1																						1
Germany						6																		6
Greece							1																	1
Hungary						1		1					4											6
Italy															3								30	33
Lithuania								1			1													2
Mexico														1										1
Palestine								1																1
Poland						1		12								10								23
Russia	1					4		22			1							1						29
Rumania								1									1							2
Sweden																				1				1
Syria																					3			3
Turkey			1																					1
United Kingdom										1									1					2
Yugoslavia																						1		1
Total	7	1	1	1	1	16	1	38	1	1	2	6	4	1	3	10	1	1	1	1	3	3	30	134

Races of immigrants deported on medical certificates during fiscal year ending June 30, 1923.

Race.	Adults.		Children.		Total.
	Men.	Women.	Male.	Female.	
African (black)	27	26	1	1	55
Albanese	2	1	0	0	3
Arabian	1	0	0	0	1
Armenian	5	8	0	2	15
Assyrian	1	1	0	0	2
Austrian	2	1	0	0	3
Bulgarian	2	1	0	0	3
Canadian	0	1	0	0	1
Cuban	10	0	0	0	10
Czechoslovakian	18	7	0	0	25
Dutch	5	0	0	0	5
English	29	6	1	2	38
Finnish	3	3	0	0	6
French	6	3	1	0	10
German	97	37	8	3	145
Greek	14	7	1	2	24
Hebrew	83	61	28	26	198
Hindoo	2	0	0	0	2
Irish	21	12	2	4	39
Italian (North)	3	3	0	1	7
Italian (South)	173	24	10	12	219
Lithuanian	3	2	1	0	6
Magyar	8	4	1	0	13
Maltese	0	2	0	0	2
Mexican	1	1	0	0	2
Mongolian	49	4	10	0	63
Persian	1	0	0	0	1
Polish	23	22	1	2	48
Portuguese	5	0	0	0	5
Rumanian	7	1	0	0	8
Russian	7	2	1	0	10
Scandinavian	18	2	2	1	23
Scotch	16	1	0	1	18
Serbian	1	0	0	0	1
Spanish	36	1	0	0	37
Spanish-American	4	0	0	0	4
Syrian	8	0	1	0	9
Swiss	2	3	0	0	5
Welsh	2	0	0	0	2
Yugoslovian	12	6	0	0	18
Not specified	1	0	0	0	1
Total	708	253	69	57	1,087

Summary of hospital transactions.

Number of patients in hospital at the beginning of year	191
Number of patients admitted to hospital during year[1]	11,057
Total treated (men, 4,335; women, 4,258; male children, 1,319; female children, 1,336)	11,248
Births (male, 11; female, 19)	30
Deaths (men, 26; women, 23; male children, 34; female children, 30)	113
Pay patients treated during year	10,493
Free patients treated during year	755
Number of days treatment pay patients	106,218
Number of days treatment free patients	11,022
Total number of days treatment for hospital cases	117,240
Maximum number of patients in hospital at any time during year	558
Daily average number of patients in hospital	321+
Number of patients in hospital at end of year	156

[1] 554 beneficiaries not included in this statement.

Hospital summary.

Hospital.	From previous. year.	Admitted.	Total treated.	Recovered.	Improved.	Not improved.	Died.	Remaining.	Total treatment (days).
Aliens	191	11,057	11,248	6,699	1,006	3,274	113	156	117,240
Beneficiaries	23	531	554	253	230	39	17	25	17,028

Nativity and sex of immigrants admitted to hospital during fiscal year ending June 30, 1923.

Nativity.	Adults.		Children.		Total.
	Men.	Women.	Male.	Female.	
Albania	4	6		1	11
Argentina	6	2	6	3	17
Arabia	5	2	1		8
Austria	86	85	18	18	207
Assyria		1			1
Armenia	38	92	31	18	171
Algeria	1				9
Australia	1				1
Belgium	9	6			15
British East Indies	36	3			39
British West Indies	119	227	11	15	372
Bulgaria	10	11	1	5	27
Brazil	12	5	2	3	22
Bohemia		1			1
Canal Zone	1				1
Cuba	25	4	4	2	35
Croatia		1			1
China	254	22	14		290
Czechoslovakia	79	201	50	49	379
Chile	18				18
Colombia	6	1			7
Canada	11	6	1	2	20
Costa Rica	2				2
Dutch West Indies	1				1
Denmark	39	18	3	9	69
Egypt	7	3		2	12
Ecuador	4				4
Esthonia	1	1			2
France	29	23	10	3	65
Finland	29	38	4	1	72
Greece	77	89	22	16	204
Germany	344	413	83	75	915
Holland	30	21	13	8	72
Hungary	62	138	43	44	287
Haiti	2				2
Honduras	5				5
Italy	824	606	160	224	1,814
Japan	8				8
Latvia	10	14	3	2	29
Lithuania	44	89	18	16	167
Liberia	1				1
Morocco	1				1
Montenegro	1				1
Mexico	8	4			12
Malta	11	1	2		14
New Zealand	1	1			2
Newfoundland	2				2
Norway	82	39	9	2	132
Nova Scotia	1				1
Portugal	35	10	4	2	51
Panama	3			3	6
Palestine	10	4	5	1	20
Poland	376	573	218	207	1,374
Persia	5	4	1	4	14
Peru	6				6
Porto Rico	4	1			5
Rumania	92	110	50	38	290
Russia	342	611	237	267	1,457
San Salvador	1				1
Spanish-America	1				1
Spain	137	28	12	12	189
Switzerland	17	19	3	3	42
Syria	28	29	14	10	81
Serbia	4	2	1	2	9
Sweden	103	57	9	5	174
San Domingo	4	4	3		11
South Africa	1				1
Turkey	61	67	23	13	164
Ukraine	2	2		1	5

Nativity and sex of immigrants admitted to hospital during fiscal year ending June 30, 1923.—Continued.

Nativity.	Adults.		Children.		Total.
	Men.	Women.	Male.	Female.	
United States born	25	12	98	106	241
United Kingdom	435	352	75	88	950
Venezuela	5			1	6
Yugoslovakia	46	99	19	20	184
Not specified	151	62	6	8	227
Total	4,241	4,220	1,287	1,309	11,057

Race and sex of immigrants admitted to hospital during fiscal year ending June 30, 1923.

Nativity.	Adults.		Children.		Total.
	Men.	Women.	Male.	Female.	
Albanese	4	6		1	11
Assyrian	5	1	1		7
Arabian	18	10	2	4	34
Austrian	6	7	2	1	16
Armenian	90	162	56	33	341
African (black)	141	237	12	17	407
Australian	2				2
Argentinan	1				1
Bulgarian	12	12	1	5	30
Brazilian	9	3		1	13
Bohemian	5	5	1	1	12
Chilean	10				10
Croatian	4	9	2	1	16
Canadian	6		3	3	12
Cuban	17	4	3	2	26
Dutch and Flemish	40	24	13	9	86
English	171	94	36	30	331
Esthonian	1	1			2
Egyptian	5	2		1	8
Finnish	24	30	3	2	58
French	24	24	9	3	60
Fiji Islands	1				1
Greek	83	94	19	14	210
German	470	605	142	129	1,346
Hebrew	649	1,045	389	402	2,485
Hungary	2	2		1	5
Hindoo	41	1			42
Irish	143	192	15	29	379
Italian (North)	65	58	9	15	147
Italian (South)	760	544	150	210	1,664
Japanese	8				8
Lithuanian	27	49	10	13	99
Lettish	3	1			4
Montenegrin	1				1
Mongolian	256	22	14		292
Mexican	7	1			8
Magyar	54	107	36	36	233
Maltese	14	1	2		17
Newfoundland	1	1			2
Nova Scotian	1				1
Peruvian	5				5
Portuguese	37	11	4	2	54
Polish	138	225	102	101	566
Russian	27	23	10	1	61
Rumanian	21	18	5	4	48
Ruthenian	1	2			3
Spanish	184	31	14	13	242
Scotch	75	55	19	24	173
Serbian	9	10	2	4	25
Slovak	102	245	60	58	465
Syrian	30	27	13	7	77
Scandinavian	234	126	21	15	396
Spanish-American	2				2
Singhalese	1				1
Switzerland	4	1	0	1	6
Turkish	3	4	2		9
Ukraine	4	9		1	14
United States born	25	12	98	106	241
Welsh	7	5	1	1	14
Not specified	151	62	6	8	227
Total	4,241	4,220	1,287	1,309	11,057

Causes of deaths in aliens.

Abscess lung, right (oedema of lungs)	1
Aneurism arch of aorta (bronchitis, chronic)	1
Angina, Ludwig's (tonsillitis, follicular)	1
Appendicitis, acute (peritonitis, general)	1
Arteriosclerosis, cerebral (hemiplegia, left)	1
Autointoxication, acute (jaundice, hematogenous)	1
Bronchitis, chronic (tuberculosis, pulmonary, chronic, senility)	1
Carbuncle, neck (diabetes mellitus)	1
Diabetes, mellitus (general debility)	1
Dilatation, cardiac, acute (myocarditis, chronic)	1
Diphtheria nasal (hemorrhagia) (otitis media)	1
Diphtheria laryngeal (lymphadenitis of neck)	1
Diphtheria laryngeal (otitis media, acute)	1
Diphtheria laryngeal (pneumonia, lobular)	4
Diphtheria laryngeal (pneumonia, lobar)	1
Encephalitis, lethargic (influenza)	1
Erysipelas (nontraumatic) (nephritis, acute)	1
Gastroenteritis (bronchitis, acute, vaccinia inf.)	1
Gastroenteritis (malnutrition)	1
Hemiplegia, right, rheumatic fever (senility)	1
Hemorrhage, cerebral (paralysis, left side)	1
Hemorrhage, cerebral (hemiplegia, left side, bronchitis, chronic)	1
Inanition, due to lack of proper food (bronchitis, acute)	1
Inanition, due to premature birth	1
Influenza (pneumonia, lobular)	1
Influenza (edema larynx, and trachea)	1
Lymphangiectasis	1
Malnutrition (inanition)	1
Measles, pneumonia, broncho (otitis, media, acute)	1
Measles, pneumonia, broncho (cellulitis of face)	1
Measles (tuberculosis, chronic, active)	1
Measles (mastoiditis, acute, left)	1
Measles (pneumonia, lobar)	4
Measles (mastoiditis, bilateral, and otitis media)	1
Measles, mastoiditis, acute (scarlet fever, bilateral	1
Measles (cellulitis of neck, suppurative)	2
Measles (scarlet fever, cellulitis of neck, otitis media, acute, left)	1
Measles (pneumonia, broncho (Mongolian, idiocy)	1
Measles, (pneumonia, lobular, and otitis media)	2
Measles (pneumonia, lobular)	12
Measles (lymphadenitis, pneumonia, lobular, cervical, acute)	1
Measles, otitis media, bilateral (pneumonia, lobular)	2
Mental deficiency, "idiocy" (measles, pneumonia, broncho)	1
Nephritis, interstitial, chronic (uremia)	1
Pneumonia, lobular (asthma)	1
Pneumonia, lobular (pleurisy, acute)	2
Pneumonia, lobular, (tonsillitis, acute)	1
Pneumonia, lobular (tonsillitis, acute, and otitis media)	1
Pneumonia, lobular (bronchitis, acute)	2
Pneumonia, lobular (mania, acute)	1
Pneumonia, lobular (pulmonary oedema)	1
Pneumonia, lobular, (senility)	1
Pneumonia, lobar (gastroenteritis)	1
Pneumonia, lobar, massive, right (empyema, right, and imbecility)	1
Pneumonia, lobar (edema of lungs, acute)	1
Pneumonia, lobar, left side (bronchitis, acute)	1
Pneumonia, lobar, senility	1
Pneumonia, lobar (pleurisy, acute)	2
Pneumonia, lobar, double (edema of lungs)	1
Pneumonia, lobar, massive, right (pleurisy, right side)	1
Pneumonia, lobar, massive, left (laryngitis and bronchitis, acute)	1
Pneumonia, lobar, double (bronchitis, acute)	1
Premature delivery (inanition)	2
Senile dementia (dilatation of heart, acute)	1
Rheumatic fever, acute (parotitis, acute)	1

Scarlet fever (pneumonia, lobar)	1
Scarlet fever (pneumonia, broncho, and empyema)	1
Scarlet fever (otitis media, pleurisy with effusion)	1
Scarlet fever (cellulitis, acute, bilateral)	1
Scarlet fever (cellulitis of neck)	1
Scarlet fever (pneumonia, lobular)	1
Scarlet fever (measles)	1
Senility (erysipelas) (nephritis, chronic)	1
Stillbirth	3
Trichophytosis of nails (cardiac dilatation and edema of lungs, senility)	1
Tuberculosis, pulmonary, chronic, active (bronchitis, chronic)	1
Tuberculosis, pulmonary, chronic, active (senility)	4
Tuberculosis, pulmonary, chronic (tuberculous, laryngitis)	1
Tuberculosis, pulmonary, chronic (pleurisy, acute)	1
Tuberculosis, pulmonary, chronic, advanced (tuberculous, laryngitis)	1
Valvular disease of heart, combined lesions, aortic and mitral (cardiac hypertrophy, cardiac arrhythmia)	1
Valvular disease of heart, mitral insufficiency (rheumatic fever, acute, pneumonia, lobar, double)	1
Whooping cough (pneumonia lobular)	1
Total	113

Operations performed.

Incision and drainage, mastoid abscess	1
Incision and drainage, fistula in ano	1
Incision and drainage, anterior cervical abscess	1
Incision and drainage, rectal abscess	1
Incision and drainage, abscess left chest	1
Incision and drainage, abscess left breast	1
Incision and drainage of leg	5
Incision and drainage of knee	3
Incision and drainage, abscess of buttock	1
Incision and drainage, cervical adenitis	4
Incision and drainage, lymphadenitis	15
Intubation	1
Mastoidotomy with drainage	23
Phlebectomy	6
Resection of rib	12
Skin grafting, pin point	1
Spinal puncture	13
Suture of first finger, left hand	1
Suture of stump of left leg	1
Suture of nose	1
Suture of right wrist	1
Suture of left cheek	1
Suture of third finger, right hand	1
Suture of scalp	1
Suture of wound of head	1
Suture of left hand	1
Suture of two fingers, right hand	1
Suture of left forearm	1
Suture of right wrist	1
Tonsillectomy	17
Tracheotomy	1
Trachoma expressions	22
Varicocelectomy	5
Obstetrics, labor (delivered), normal	26
Severance of adhesions	1
Cæsarian section	1
Dorsal slit for phimosis	2
Total	1,338

NOGALES, ARIZ.

Acting Asst. Surg. A. L. Gustetter, in charge.

A few cases of smallpox were reported at Nogales and at several other small towns in the southern part of the State of Sonora, Mexico. The Sonora State Government required all persons unprotected against smallpox to be vaccinated, and the disease was promptly eradicated.

No special quarantine regulations were put in force at this port, other than the usual routine of vaccinating those not showing a recent successful vaccination.

OROVILLE, WASH.

Acting Asst. Surg. Frank S. Beale, in charge.

Since there is only one immigrant inspector at this station it was incumbent on the medical officer to serve as a member of the board of special inquiry. Fifty-six cases were handled by this board during the year.

PENSACOLA, FLA.

Acting Asst. Surg. S. R. Mallory Kennedy, in charge.

As previously noted, the total number of aliens reported is not a true index of the number of aliens examined. Certain ships regularly engaged in trade between Pensacola and Habana make about one trip a month, and the same alien is therefore examined more than once during the year. If one of these aliens happens to have a defect, this same defect may be repeatedly certified as long as this alien remains in this trade.

There has been noted a marked decrease in venereal disease among alien seamen arriving in this port during the past year. All alien seamen are mustered by name before the examining officer and a careful visual examination of the genitalia is made to discover venereal infection.

No hospital is maintained at this port by the Immigration Service for the hospitalization or treatment of alien seamen affected with contagious diseases, but alien seamen certified for a dangerous contagious disease are removed to the Pensacola Hospital and held there until cured or released on the certificate of the medical officer in charge of the relief work at this port.

In order to insure detention, seamen are provided with pajamas upon entering the hospital and their clothing is held until they are discharged.

The crews of vessels on which alien seamen have been certified for venereal disease are not checked up upon departure.

All necessary clinical laboratory tests are made by the bacteriologist of the State board of health laboratory.

PHILADELPHIA, PA.

Surg. Carroll Fox, in charge.

Immigration into the port of Philadelphia was light during the past year.

The usual examinations of warrant cases and reexaminations of detained passengers and crews were made. Medical relief was furnished to those held in the detention station.

PHILIPPINE ISLANDS.

Surg. H. F. Smith, chief quarantine officer for the Philippine Islands, in charge. Address, P. O. Box 424, Manila, P. I.

Immigration at ports in the Philippine Islands consists mainly of Chinese and Japanese. A large percentage of the Chinese aliens are children of domiciled parents, whereas the majority of the Japanese aliens are laborers en route to the southern islands.

In the Philippine Islands the collector of customs is charged with the enforcement of the immigration act. Owing to the fact that neither space for medical examination nor adequate personnel is provided, very little active work was done during the first nine months of the present fiscal year. Efforts were begun on April 1, 1923, to make medical examinations of all arriving aliens. It has been necessary to conduct the inspection of arriving aliens on the decks of the vessels which bring them to the islands. Aliens who present evidence of certifiable diseases or conditions at this inspection are detained for a more complete examination on shore at the service office. While this arrangement is not satisfactory, it is at least a start toward what is hoped to be the full enforcement of the regulations governing the medical inspection of aliens. The extremely high incidence of favus among the arriving alien Chinese children, especially those from Amoy, and the high incidence of intestinal parasites among practically all arriving aliens, certainly warrants better facilities for the medical examination of aliens than are now provided. The Philippine Legislature has been requested to provide additional funds for this work, and it is proposed during the coming fiscal year to make stool examinations on all incoming Asiatic aliens and to provide laboratory facilities and personnel for the diagnosis of favus and other conditions requiring laboratory procedure. At the close of the present year, stool examinations were being made on all incoming Japanese at the port of Manila, but it has been impossible to extend this work to other ports.

The following tabulation shows the number of aliens entering various ports of the islands during the fiscal year under report:

Port.	Number of alien passengers arriving during the year.	Number of alien passengers certified.
Manila	6,283	32
Cebu	17	0
Iloilo	0	0
Olongapo	0	0
Cavite	0	0
Jolo	53	0
Zamboanga	185	0
Total	6,538	32

Of the 32 cases certified, 1 was found to be suffering from trachoma and was deported, and 31 were found to be suffering from favus of the scalp, 1 of these was deported, and 30 remained under treatment at the close of the fiscal year.

PORTAL, N. DAK.

Acting Asst. Surg. Rolingford M. Parker in charge.

Traffic through this port was about 15 per cent heavier during this than during the preceding year.

Passengers entering consist chiefly of train travelers coming from farming communities of the Canadian northwest.

PORT HURON, MICH.

Acting Asst. Surg. George M. Kesl in charge.

Aliens held for warrant and deportation were provided with any necessary treatment. In several cases medical examinations were made to determine whether mental or physical defect or disease had existed prior to landing and the proper certificates were issued.

PROVIDENCE, R. I.

Surg. W. A. Korn in charge.

This station is a substation of the Boston (Mass.) immigration station, and certified passengers are taken to Boston for further examination.

QUEBEC, CANADA.

Surg. O. H. Cox in charge.

As is generally known, the St. Lawrence River, owing to ice formation, is open to navigation only from (about) May 1 to some time in November. There are a number of steamship lines which carry passengers to Quebec and Montreal. Although the latter port is the terminus for practically all such vessels, only the cabin passengers are landed there, all third-class cases being landed at Quebec after examination by either the Canadian or the United States immigration service, depending upon the ultimate destination of the passenger.

As in previous years an adequate portion of the wharf building designated for the use of the Canadian immigration department is used by the United States immigration officials. Detention and hospital facilities are also available.

The so-called "border" cases consist mostly of local French inhabitants of the Province of Quebec, who are inspired by industrial conditions to gain admission to the United States. While it might appear that examination of these is secondary in importance to handling of overseas cases, nevertheless such a number of disqualifying defects have been found in proportion to those found in the much-examined applicants coming by vessel that such a procedure of selective immigration seems highly justifiable.

SAN FRANCISCO, CALIF.

Surg. Dunlop Moore in charge.

Important causes of certification were the following:

Uncinariasis	157
Clonorchiasis	106
Trachoma	7

Hospital admissions during the year totaled 511. Important causes of admission were uncinariasis, 143; mumps, 47; and scabies, 41. Of cerebrospinal fever there were 17, as compared with 10 cases

during the previous year. In addition to cases admitted to hospital, out-patient treatment for minor ailments was given to a total of 720 detained aliens and Government employees.

Four thousand and one hundred specimens of feces were examined for ova of intestinal parasites, in addition to the routine examinations of blood, sputum, urine, etc.

Medical opinions on various subjects have been submitted when requested by the commissioner. In this connection, 92 aliens were especially examined with a view to determining their approximate ages.

SEATTLE, WASH.

Asst. Surg. H. D. Ogden, jr., in charge.

In Seattle the majority of aliens presented for examination by the Immigration Service are steerage passengers, since the first-class passengers are generally examined at the Port Townsend quarantine station. Most of the arriving aliens are Japanese or Chinese, although there has been a perceptible increase in the number of Russians, who have appeared singularly free from disease.

The most common causes for certification were uncinariasis, trachoma, and clonorchiasis. A routine examination is made of the stools of all third-class aliens, and it not infrequently happens that triple and quadruple parasitic infestations are demonstrated, i. e., clonorchiasis, uncinariasis, trichiniasis, and ascariasis. The two latter conditions are not certified, although many of the arriving aliens harbor vast numbers of these worms.

All cases of uncinariasis are treated by the service in the immigration station. The use of oil of chenopodium has been abandoned and carbon tetrachloride is being used in its place. The results are gratifying in cases of "hookworm disease," but it seems to have no influence on *Clonorchis sinensis*. The dose used at this station is 6 c. c. for an adult person weighing 150 pounds.

Only two cases of trachoma have been treated; the remainder of those certified for this disease have been deported.

Crews of passenger vessels are inspected at this station; those of freighters at Port Townsend. The most common diseases found are trachoma, gonorrhea, syphilis, and chancroidal infection.

The Commissioner of Immigration is desirous that the service treat cases of venereal disease at the immigration station; but as there are no facilities for the isolation and care of these men at present, they have, until recently, been sent to the United States marine hospital at Port Townsend. They are now allowed to remain aboard ship if there is a surgeon among the vessel's complement. This seems to be a satisfactory arrangement.

All cases of arrest awaiting deportation at the immigration station are examined as soon as possible after their arrival; and if any suspicion is entertained that a person is afflicted with a contagious or infectious disease, he is isolated and observed. No epidemics have appeared during the past year, and no deaths have occurred, in spite of the fact that the isolation quarters are inadequate, due to the limited space of the present building.

At the request of the commissioner, detained aliens who were hospitalized have been treated by this office.

Medical opinions on various subjects have been submitted. In this connection, examinations have been made to determine the approximate age of aliens, pregnancy, the ability of an alien to earn a living, etc.

TUCSON, ARIZ.

Acting Asst. Surg. J. E. Huffman, in charge.

The United States Immigration Service detention quarters located at Tucson have accommodations for 24 male and 12 female aliens, and in an emergency several could be quartered in the station's hospital room. All detained aliens are examined by the medical officer, who also prescribes for them, and when necessary personally attends them. Numerous cases of aliens confined in the local county and city jails, awaiting trial or serving sentence, are made the subject of deportation proceedings by immigration officers, and are, of course, examined by the medical officer, though in this class of cases he does not prescribe for nor attend them until they are turned over to the Immigration Service.

VICTORIA, B. C., CANADA.

Acting Asst. Surg. C. Denton Holmes, in charge.

The classes of aliens passing through this office have been very much the same as those of the last two or three years, although about double in number.

The port of Victoria has been unusually free from disease during the year. There have been no epidemics.

WINNIPEG, MANITOBA, CANADA.

Acting Asst. Surg. Harry J. Watson, in charge.

The year 1923 has seen the heaviest traffic in many years, owing largely to economic conditions. Thousands of people have left to seek employment in the United States, and, upon finding it, have very soon afterwards sent for their families. Newspapers have given publicity to the large exodus of citizens to the lands south of the international line; and the high wages received in the United States have materially stimulated the outflow of these people. There has not been a sufficient number of immigration authorities here to handle the crowds, and many individuals have gone over the border without examination. Thousands have gone by train who have received no medical examination other than that given in transit by the immigration officer.

The class of aliens admitted during the past year is of the best, consisting largely of Canada's choice workers, who, after years of work here, have left for a fresh start in the United States. It is predicted that many will return to Canada again. Western Canada has a wonderful crop for 1923; and if a high price is maintained, many will return.

Trachoma cases were few in number, and when found were sent to the Canadian authorities for treatment.

The medical officer acknowledges with appreciation the courtesies shown him by health officers, physicians, and hospital superintendents in obtaining proper and accurate diagnoses of cases crossing the border for medical treatment.

SANITARY REPORTS AND STATISTICS.

In charge of Asst. Surg. Gen. B. J. Lloyd.

The functions of the division of sanitary reports and statistics as at present organized may be enumerated as follows: (1) To collect information of the prevalence and geographic distribution of diseases and other sanitary data essential to the work of the Public Health Service or necessary to efficiency in State or local health administration; (2) to compile in statistical form sanitary data which can in this way be made useful and (3) to publish for the information of those engaged in public health activities such of the information and statistics as will be of assistance in their work; (4) to compile, publish, and distribute State and municipal laws and regulations and judicial decisions relating to public health; (5) to carry on a campaign of public health education.

All research work and all field studies in statistics are now carried on in the division of scientific research.

Morbidity Reports.

Prompt and accurate information of the prevalence of diseases dangerous to the public health is essential to the work of the Public Health Service. Epidemics do not recognize State lines, and in order to prevent the spread of disease through interstate communication, endemic and sporadic cases must be located promptly and the location and extent of epidemics must be known before they are beyond control.

COLLABORATING AND ASSISTANT COLLABORATING EPIDEMIOLOGISTS.

The plan of appointing representatives of the Public Health Service in State and municipal health departments for the purpose of securing morbidity reports was continued during the fiscal year.

In States where the plan has been put in operation, physicians report to the assistant collaborating epidemiologists each case of a notifiable disease on an addressed penalty card, the cards being furnished for this purpose by the Public Health Service. In cities of over 10,000 population the assistant collaborating epidemiologist reports weekly to the Public Health Service, on blanks furnished for the purpose, giving the number of cases of each disease, the number of deaths registered as caused by each disease during the preceding week, and the total number of deaths registered for the week. Reports are made by all assistant collaborating epidemiologists at regular intervals to the collaborating epidemiologist in the State health department. From these reports, together with other information coming to the State officers, the State reports to the Public Health Service are prepared.

Collaborating epidemiologists have been appointed in 42 States. They are officers of the State health departments (in most cases the

State health officer being selected) and their duties are to secure data regarding the prevalence and geographic distribution of diseases dangerous to the public health and forward it to the Public Health Service by telegraph or mail.

In 35 States assistant collaborating epidemiologists are acting as agents of the Public Health Service. They are officers of municipal or county health departments, and their duties are to secure reports of cases of notifiable diseases and report to the Public Health Service either directly or through the collaborating epidemiologists for their respective States.

The following table shows the States which have adopted the plan in whole or in part, and the number of assistant collaborating epidemiologists in each State at the close of the fiscal year:

Collaborating and assistant collaborating epidemiologists as of June 30, 1923.

State.	Assistant collaborating epidemiologists.	State.	Assistant collaborating epidemiologists.
Alabama	69	Missouri	119
Arizona	14	Montana	0
Arkansas	232	Nebraska	96
California	301	New Jersey	0
Colorado	213	New Mexico	32
Connecticut	0	North Carolina	96
Delaware	0	North Dakota	83
Florida	4	Ohio	157
Georgia	26	Oklahoma	1
Idaho	0	Oregon	130
Illinois	103	South Carolina	0
Indiana	539	South Dakota	63
Iowa	314	Tennessee	2
Kansas	116	Texas	320
Kentucky	130	Vermont	10
Louisiana	9	Virginia	23
Maine	474	Washington	20
Maryland	76	West Virginia	106
Massachusetts	0	Wisconsin	228
Michigan	2	Wyoming	24
Minnesota	1		
Mississippi	83	35 States	4,216

STATE MORBIDITY REPORTS.

The cooperation of State health officers has been of great assistance to the Public Health Service in securing reports of diseases dangerous to the public health, both in States where collaborating epidemiologists have been appointed and where the plan has not yet been adopted. Although the information of the prevalence of disease is yet far from complete or satisfactory, there is noticeable improvement in the reports received and published by the Public Health Service. More States reported during the fiscal year than ever before, and the reports from many localities showed that a greater percentage of the cases were reported than formerly. The establishment of a registration area for morbidity would stimulate endeavor along this line and make it possible to secure much more nearly complete and accurate reports than has been possible heretofore, as well as to secure information more promptly, which is of vital importance

WEEKLY TELEGRAPHIC REPORTS.

During the fiscal year ended June 30, 1923, telegraphic reports were received weekly from 38 States. These reports are sent on

Monday, and include the number of cases of the more important communicable diseases reported to the State health officers for the preceding week. They are preliminary reports, not complete, and it is not practicable to compare different States on the basis of these telegrams, but they are current reports received promptly, and comparisons of the reports from a certain State for different weeks can be fairly made, as the telegrams give a fairly accurate index of the relative prevalence of the diseases reported at different times.

The following is a list of the States from which telegraphic reports were received:

Alabama.
Arizona.
Arkansas.
California.
Colorado.
Connecticut.
Delaware.
District of Columbia.
Florida.
Georgia.
Illinois.
Indiana.
Iowa.
Kansas.
Louisiana.
Maine.
Maryland.
Massachusetts.
Michigan.
Minnesota.
Mississippi.
Missouri.
Montana.
Nebraska.
New Jersey.
New Mexico.
New York.
North Carolina.
North Dakota.
Oregon.
South Dakota.
Texas.
Vermont.
Virginia.
Washington.
West Virginia.
Wisconsin.
Wyoming.

MONTHLY REPORTS.

Monthly reports of the number of cases of communicable diseases were received from 42 States. These reports give more detail than the telegraphic reports, showing the geographical distribution of the cases within the State. The total number of cases of the more important diseases in each State was published currently as received, and the data were published in full in tables covering periods of three months.

These reports were received from the following-named States:

Alabama.
Arizona.
Arkansas.
California.
Colorado.
Connecticut.
Delaware.
District of Columbia.
Florida.
Hawaii.
Idaho.
Illinois.
Indiana.
Iowa.
Kansas.
Louisiana.
Maine.
Maryland.
Massachusetts.
Michigan.
Minnesota.
Mississippi.
Montana.
Nebraska.
New Jersey.
New Mexico.
New York.
North Carolina.
North Dakota.
Ohio.
Oklahoma.
Oregon.
Pennsylvania.
Rhode Island.
South Carolina.
South Dakota.
Vermont.
Virginia.
Washington.
West Virginia.
Wisconsin.
Wyoming.

ANNUAL REPORTS.

Only one State failed to supply data for the calendar year 1922 to be incorporated in the annual summary of the prevalence of notifiable diseases in the United States. Reports were also received from Hawaii, Porto Rico, and the Philippine Islands.

These summaries show the number of cases of the more important communicable diseases notified in each State, by months, the total of which is compared with the median number of cases reported annually from 1913 to 1921, inclusive; the number of cases of each disease per thousand population; the number of deaths, and the

death rate in each State from each disease for the year 1922, and the number of deaths per hundred cases or the number of cases reported for each death registered.

CITY REPORTS.

Weekly reports of the prevalence of communicable diseases were received from 560 cities in the United States having 10,000 population or more. These reports show the number of cases of each diesase reported in each city, the deaths attributed to each disease, and the number of deaths from all causes during the week.

The following table shows the number of cities in each State from which reports were received:

Alabama	6	Nebraska	2
Arizona	1	Nevada	1
Arkansas	4	New Hampshire	7
California	21	New Jersey	32
Colorado	4	New Mexico	1
Connecticut	18	New York	38
District of Columbia	1	North Carolina	7
Florida	3	North Dakota	3
Georgia	8	Ohio	42
Idaho	2	Oklahoma	2
Illinois	27	Oregon	1
Indiana	22	Pennsylvania	77
Iowa	14	Rhode Island	7
Kansas	12	South Carolina	3
Kentucky	6	South Dakota	1
Louisiana	2	Tennessee	4
Maine	8	Texas	12
Maryland	3	Utah	1
Massachusetts	62	Vermont	3
Michigan	19	Virginia	9
Minnesota	10	Washington	8
Mississippi	1	West Virginia	10
Missouri	7	Wisconsin	21
Montana	6	Wyoming	1

Two annual summaries were published giving statistics for the calendar year 1922, one for cities having more than 100,000 population and the other for cities having from 10,000 to 100,000 population. The latter was delayed for some time owing to the delay in receiving official estimates of populations. Case and death rates per thousand population and the fatality rate (deaths per hundred cases) were computed and published.

FOREIGN REPORTS.

Reports of quarantinable diseases and of other communicable diseases were received during the year from medical officers of the Public Health Service stationed abroad, American consular officers, the public health agencies of foreign countries, the League of Nations, and from other sources. The information was tabulated and published currently in the weekly Public Health Reports for the information of quarantine officers, State and city health officers, and others concerned.

The reports from American consuls were received pursuant to the provisions of section 4 of the act of February 15, 1893. They give information concerning the prevalence of diseases dangerous to the public health which might be introduced into the United States.

Serious difficulties are often encountered by the consular officers in securing accurate information, especially in countries where conditions are unsettled and records are not kept or are unreliable. The information furnished is not complete; that secured from many places is fragmentary; but nevertheless the reports contain valuable data which often warn of serious danger threatening the health of our people.

Prevalence of Disease.

During the fiscal year ended June 30, 1923, there was no widespread epidemic of national importance, except dengue, which occurred in a number of States during the summer and fall of 1922, and influenza of a mild form which was prevalent over most of the country during the early months of 1923.

The following table gives a summary of reports received from State health officers for a few of the more important communicable diseases for the calendar year 1922:

Disease.	Number of States reporting.[1]	Aggregate population.	Cases reported.	Deaths reported.	Cases per 100,000 population.	Deaths per 100,000 population.	Deaths per 100 cases.
Diphtheria	44	102,828,450	168,790	14,684	164.1	14.3	8.7
Measles	44	102,828,450	260,833	3,592	253.7	3.5	1.4
Scarlet fever	42	102,291,810	157,043	3,320	153.5	3.2	2.1
Smallpox	41	96,718,290	30,247	758	31.3	.8	2.5
Tuberculosis	44	102,828,450		94,566		92.0	
Typhoid fever	43	101,997,270	35,244	8,036	34.6	8.0	22.8

[1] In addition to the number of States given, the District of Columbia is included.

A notable feature of the morbidity reports during the calendar year 1922 is the increase in the virulence of smallpox in certain localities. For many years cases of smallpox have been reported from most of the States, but there have been comparatively few deaths from this disease. During the calendar year 1922 the State of Colorado reported 1,086 cases of smallpox and 270 deaths, giving a fatality rate of 24.9 deaths per 100 cases.

The following table shows the increased virulence of the disease in a few large cities where the virulent type of the disease occurred in 1922:

Smallpox cases, deaths, and fatality rates in Chicago, Denver, and Kansas City (Mo.), 1919 to 1922, inclusive.

	Reports for year—			
	1919	1920	1921	1922
Chicago, Ill.:				
Cases	98	154	246	95
Deaths	0	1	4	15
Deaths per 100 cases	0	.6	1.6	15.8
Denver, Colo.:				
Cases	567	953	924	784
Deaths	0	1	37	248
Deaths per 100 cases	0	.1	4	31.6
Kansas City, Mo.:				
Cases	275	514	943	136
Deaths	2	3	156	63
Deaths per 100 cases	.7	.6	16.5	46.3

The large number of cases of smallpox which are reported in the United States each year indicate that many persons fail to avail themselves of the protection afforded by vaccination, and the sudden increase in the virulence of the disease in a few localities emphasizes the danger of neglect of this important precaution.

It has been shown that (1) successful vaccination gives almost complete protection against smallpox for a period of approximately seven years; (2) it gives partial protection against this disease for a much longer period, usually throughout life; (3) the inconveniences of revaccination are usually much less than primary vaccination. The shorter the periods between vaccinations, the less the reaction.

The decline in the incidence of typhoid fever in the United States has attracted much attention in recent years, and affords an outstanding illustration of the benefits of public health work, which includes the practical application of scientific knowledge regarding the causes of disease and the manner in which communicable diseases are spread.

The following table and the accompanying chart (p. 202) show the reduction in the death rate from typhoid fever in the "original registration States" from 1900 to 1922, inclusive. These States are Connecticut, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. The District of Columbia is also included.

Death rates per 100,000 population in the original registration States, 1900 to 1922, inclusive.

1900	31.3	1911	15.3
1901	27.5	1912	13.2
1902	26.3	1913	12.6
1903	24.6	1914	10.8
1904	23.9	1915	9.2
1905	22.4	1916	8.8
1906	22.0	1917	8.1
1907	20.5	1918	7.0
1908	19.6	1919	4.8
1909	17.2	1920	5.0
1910	18.0	1921	5.3

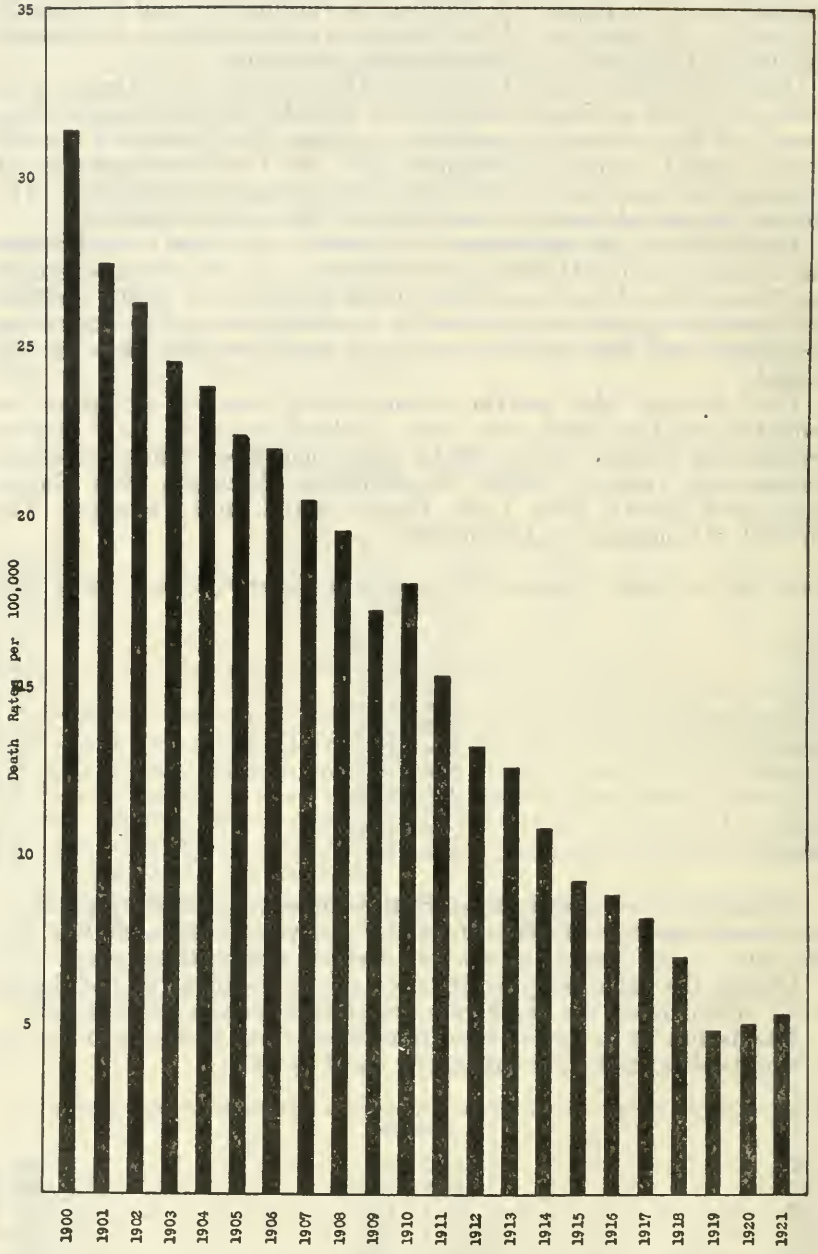
It will be noted that in these States there was a slight increase in the death rate from typhoid fever for the years 1920 and 1921, but the rate for the country as a whole declined during these years.

During the calendar year 1922, 44 States reported 94,556 deaths from tuberculosis, the death rate per 100,000 population being 92.

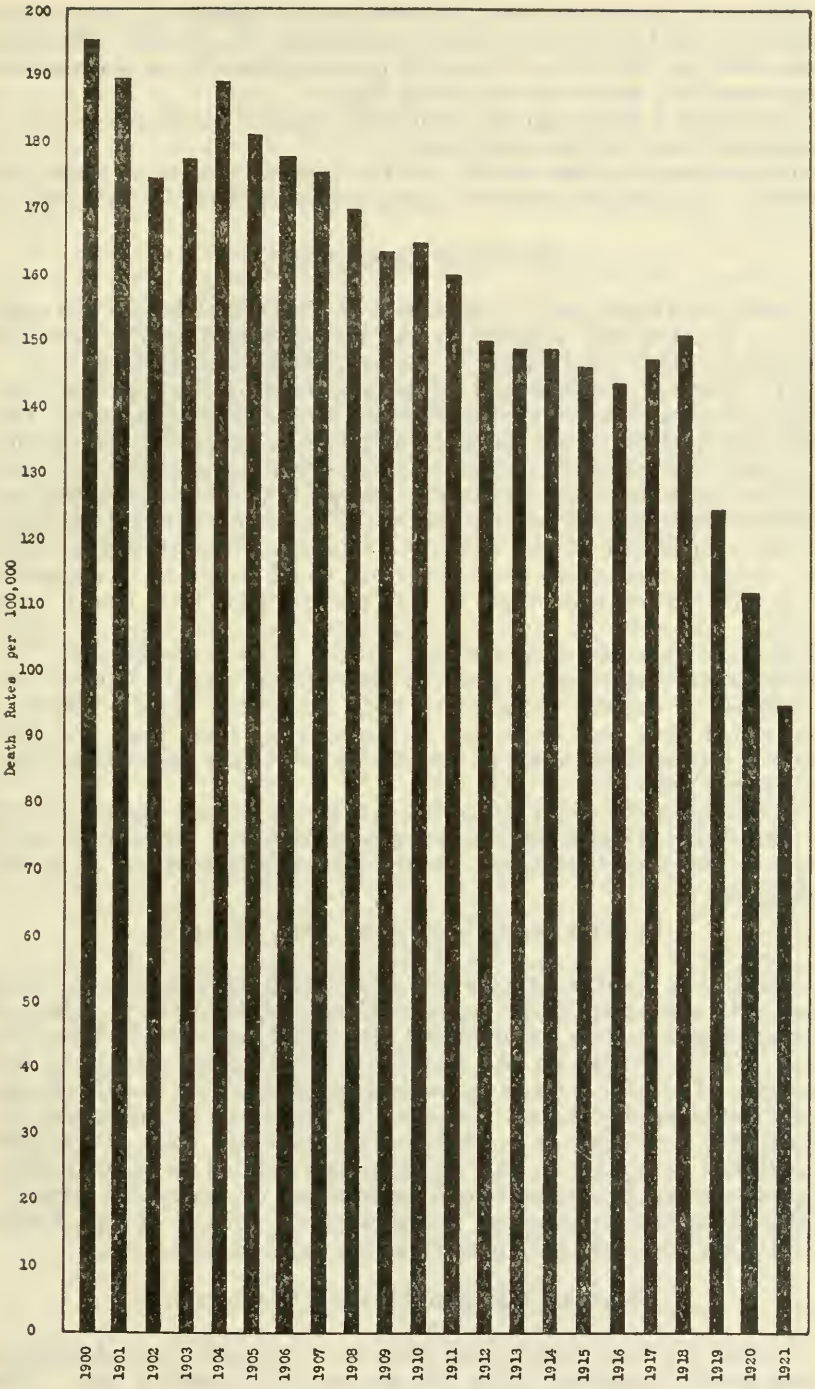
The decline in the death rate from tuberculosis is shown in the following table and the accompanying chart (p. 203).

Death rates per 100,000 population in the original registration States, 1900 to 1921, inclusive.

1900	195.2	1911	159.0
1901	189.8	1912	149.8
1902	174.1	1913	148.7
1903	177.1	1914	148.6
1904	188.5	1915	146.7
1905	180.9	1916	143.8
1906	177.8	1917	147.1
1907	175.6	1918	151.0
1908	169.4	1919	124.9
1909	163.3	1920	112.0
1910	164.7	1921	94.7



Deaths from typhoid fever per 100,000 population in the original registration States, 1900 to 1921, inclusive.



Deaths from tuberculosis per 100,000 population in the original registration states, 1900 to 1921, inclusive.

Forty-four States reported 168,790 cases of diphtheria, with 15,666 deaths from this disease, during the calendar year 1922. The case rate (164 per 100,000) is about 19 per cent lower than the rate for the year 1921, which was unusually high.

There was a decline in the number of cases of measles reported as compared with the preceding year.

Improvement is also shown by the reports of scarlet fever, the number of cases per 100,000 having decreased from 189 in 1921 to 154 in 1922.

Sanitary Legislation.

During the fiscal year a compilation of public health laws and regulations enacted and adopted by the several States during 1920 was prepared. This compilation is one of a series dating from July 1, 1911. Some of the principal subjects covered by the laws and regulations include communicable diseases, hospitals, health authorities, milk, food, water, drugs, animals, and sewage disposal. Also during the fiscal year work was started on the preparation of the 1921 and 1922 volumes of State legislation and on the volume of municipal health ordinances and regulations for the three-year period 1920–1922. In the preparation of the volume of municipal legislation the object is to include ordinances and regulations which would be of assistance to health officers and others called upon to draft local health legislation. The subjects covered by the municipal compilation are practically the same as those covered by the State compilations. The publication of municipal legislation dates from January 1, 1910.

Digests of current decisions of both State and Federal courts of last resort have been examined throughout the fiscal year, and decisions of interest from a public health viewpoint have been summarized and published.

Decisions of the Comptroller General of the United States relating to the Public Health Service have been digested currently, with a view to ultimate publication, for the information and use of service personnel.

Publications Issued by the Division.

The Public Health Reports was issued each week during the fiscal year. It contained 3,139 pages, exclusive of title pages, tables of contents, and indexes, as compared with 3,352 pages for the preceding year. Text articles on the results of scientific investigations and subjects of special interest to sanitarians and public health officials constituted approximately one-third of the material published, the remainder consisting of morbidity data collected from the sources mentioned, compiled in the division, and printed in tabular form. Eighty-one articles were issued as reprints (in pamphlet form) in order to secure economical distribution to officers of the Public Health Service and other persons as provided by law.

Section of Public Health Education.

During the fiscal year ended June 30, 1923, 108 new publications were issued, compared with 116 during the preceding year. The total number of copies of these publications and of reprints of previous

documents distributed aggregated 591,690, as compared with 949,460 copies during the preceding fiscal year. The 591,690 publications sent in response to 41,611 public requests do not include those printed and distributed by the division of venereal diseases.

During the fiscal year 27 issues of mimeographed bulletins were prepared and issued by the Public Health Service to newspapers, publishing agencies, and individuals. These dealt largely with the results of studies and investigations made by the Public Health Service.

The section received 81 requests for stereopticon slides, and in response to these requests loaned 6,075 slides. The work of the stereopticon library has been greatly hampered, owing to the shortage of slides and to the lack of funds for making new slides.

The Section of Public Health Education was called upon to furnish an exhibit for the Brazilian Centennial Exposition at Rio de Janeiro, last fall. The money for this exhibit was furnished by the Brazilian Commission of the State Department. The material furnished by this section was on exhibition from December, 1922, to June, 1923.

The section has received many requests for the loan of exhibit material, posters, and motion pictures, but because of the lack of funds compliance with most of these has been impossible.

Health Information by Radio.

During the past fiscal year the Bureau of the United States Public Health Service has made use of radio to increasing extent for the dissemination of information pertaining to health and disease prevention.

The beginning of the public health by radio information service properly dates from July 13, 1921, when the first memorandum on the possibilities of utilizing radio for this purpose was submitted for the consideration of Dr. C. C. Pierce, Assistant Surgeon General, in charge of the division of venereal diseases, although the radio service was not inaugurated until December 13, 1921. On August 16, 1921, the Surgeon General authorized a conference between the officials of the Public Health Service and the Director of Naval Communications. This conference was held September 21, 1921. There were present the Director of Naval Communications of the Navy Department, Dr. C. C. Pierce, Assistant Surgeon General in charge of the division of venereal diseases, Dr. Charles F. Bolduan, chief of the section of public health education of the Public Health Service, and Mr. L. J. Heath, assistant director of educational work. Another conference was held with Commander S. C. Hooper, United States Navy, in charge of the Bureau of Engineering, Capt. S. W. Bryant, United States Navy, and Commander A. Hoyt Taylor, in charge of the Naval Laboratory, Anacostia, D. C. In accordance with these conferences arrangements were made to assign to the United States Public Health Service certain periods of 15 minutes in length in each week for the transmission of messages by radio telephony. The Navy Department placed the facilities of the naval aircraft station, NOF, Anacostia, D. C., at the disposal of the Public Health Service for this purpose.

The unique character of this radio service, the first of its kind in history, created such a widespread sensation that during the following

six months—that is, between December, 1921, and July, 1922—applications were received from no less than six commercial broadcasting stations, located at different parts of the country, to cooperate with the Public Health Service in releasing health broadcasts. No effort was made to secure the cooperation of commercial broadcasting stations. These stations began requesting permission to broadcast educational material released by the service, and no expense was involved. At the close of the first six months period, public health messages were being released by radio through stations NOF, at Anacostia, D. C.; KFC, at Seattle, Wash.; WGI, at Medford Hillside, Mass.; 7XF, at Portland, Oreg.; WRK, at Hamilton, Ohio; CKAC, at Montreal, Canada, and KDKA, at East Pittsburgh, Pa. The fiscal year just closed has seen an increasing number of commercial stations availing themselves of the opportunity to secure their health lectures from the Public Health Service. In December of 1922 all voice broadcasting previously carried on through NOF was transferred to station NAA, the naval radio station at Arlington, Va. Thirty cooperating stations are now releasing public health by radio information twice each week. These broadcasts during the first year covered 15 minutes in each week, and in April, 1923, a change was made from 15 to 10 minute broadcasts. Practically the entire United States and Canada are now being covered by this broadcasting service.

On March 25, 1922, arrangements were concluded with the foreign-language information service whereby that service was furnished with copies for translation and use in the foreign-language newspapers in this country and abroad. These broadcasts have been translated into 16 different foreign languages.

The value of this service may be measured by the kind and amount of information disseminated by radio, the demand created for publications, the extension of popular health education based upon the number of people reached, and the effect of this information upon conduct. Public health broadcasts have covered a variety of subjects, and have dealt with simple rules of health and methods of disease prevention. In length, these broadcasts have averaged from five to seven pages. Approximately 272,250 words have been sent out through NOF and NAA. A total of approximately 2,362,250 words have been released through other cooperating stations, making a grand total of 2,634,500 words actually sent out by radio since the inauguration of this service. During the present fiscal year alone the Public Health Service, through its cooperating agencies, has "been on the air" approximately 326 hours. In all 158 different broadcasts have been prepared and transmitted.

No accurate estimate can be made of the number of people reached by the Public Health Service through its radio broadcasts and through the press, both foreign and native, which has copied these broadcasts widely and commented upon them frequently. One thousand seven hundred and twelve letters are known to have been received in response to radio broadcasts alone. This figure does not by any means represent the total number of people who have written to the service for additional information in response to radio stimulation. The records show that since December, 1921, 2,858 pieces of educational material were sent out upon request to members of the radio audience. Since the inauguration of the service, there have

been 2,562 press releases, totaling 3,112,268 words, 7,554 articles, totaling 6,294,878 words, are known to have been printed. Here it should be taken into consideration that these figures are based solely upon the number of clippings received by the Public Health Service from clipping bureaus. The clipping bureaus do not clip all articles; in fact, these figures are known to represent only a fractional part of the publicity which the Public Health Service has received through its radio. Taking the audit bureau's statement, taken from the sworn statements of circulation of newspapers which are known to have carried this publicity, Public Health Service lectures have been made available through newspapers and through radio to approximately 68,620,100 people. Nearly 78,390 inches of space in newspapers and periodicals has been devoted to the Public Health by Radio Information Service, and the material contained in these broadcasts. The gross estimated value of the radio service, computed at current rates for toll broadcasting stations, and at the average advertising rate charged by the newspapers using this material, amounts to approximately $361,127. In this connection it should be borne in mind that news space is much more valuable than advertising space and that these figures in all cases are therefore highly conservative.

The actual cost to the bureau in maintaining its public health by radio information service is insignificant. No radio equipment has been provided by the bureau.

While further expansion of this service is possible and desirable, owing to the fact that some of the radio stations are releasing these broadcasts on daylight schedules, with materially shortened range, the fact remains that there is scarcely a portion of the country which is not within range of one or more of these stations. Experience has shown that the best results have been obtained from stations in close proximity to the territory served. This is due to the increased reliability of reception. Any extensions of the service in the future should be based upon this deduction, and short-range stations, rather than long range, should be utilized for conveying health information by radio. Radio offers to the Public Health Service an unparalleled opportunity to render aid to a great mass of people hitherto inaccessible at a nominal expense. The increasing number of Government bureaus using radio during the past year is an evidence of the opportunity. Educational material has come to have a definite place in the air, and plenty of evidence is at hand that health information released by radio is having a definite effect. School teachers have copied these broadcasts in shorthand and used them in schools. Local organizations have installed radio receiving sets in auditoriums for the purpose of receiving the information sent out by this bureau. The radio service has brought popular education into remote regions and has touched a group of people hitherto uninformed in health matters. Owing to present limitations on the printing and distribution of literature, the radio service has been utilized to an extent not possible by other means.

DIVISION OF MARINE HOSPITALS AND RELIEF.

In charge of Asst. Surg. Gen. F. C. Smith.

On June 30, 1923, there were in operation 25 marine hospitals and approximately 120 relief stations. The marine hospitals at Wilmington, N. C., and Cairo, Ill., remain closed, and the sale of the former was authorized during the year (act, Public No. 426, February 17, 1923), it being no longer needed for service operations. The purchase of a site and construction of a new marine hospital at Cleveland, Ohio, out of proceeds from the sale of the present one were authorized by an act of Congress (Public No. 371, 67th Cong.). The marine hospital at Baltimore, Md., which had been closed since July 5, 1920, was reopened May 1, 1923, with a bed capacity of 167, or double its former size, the result of new construction, the items including 4 additional wards, nurses' home, and power plant. New relief stations were established to meet the demands made by increased shipping at Calais, Me., Houston, Tex., Miami, Fla., Sitka, Alaska, and Southport N. C. A total of 1,189,869 hospital relief days and 310,016 outpatient treatments were given to service beneficiaries. These relief operations, which presumably reflect the activities of the American merchant marine and the general health of its personnel, show an increase over the previous year of 2 per cent in hospital days and 14 per cent in the number of outpatient treatments for merchant seamen and other old line beneficiaries. A complete list of stations and a summary of their activities is found in Table I, page 226.

INCREASE IN VOLUME OF WORK.

The increase in relief activities is shown in Figure 1. These operations, which relate only to merchant seamen and other old line beneficiaries, and not to patients of the United States Veterans' Bureau, have trebled since 1915, and more than doubled since 1918. This is at a slightly greater rate of growth than that of the American Merchant Marine, which, according to the sixth annual report of the United States Shipping Board, increased from 11,893,437 tons in 1914 to 14,886,776 in 1918 and 28,886,212 in 1922.

Other reasons for this increase may be found in the improvement of hospital standards, which are calculated to encourage admissions, a higher regard for personal health, causing seamen to seek hospital relief earlier and more frequently than formerly, and an increased familiarity with hospitals, resulting partly from the familiarization of men in the military forces with medical matters. The increased cost of hospital care is also, no doubt, instrumental in causing American ships to send their seamen to marine hospitals, which are, in effect, as they were intended to be when the original act was passed, a direct as well as an indirect aid to American shipping.

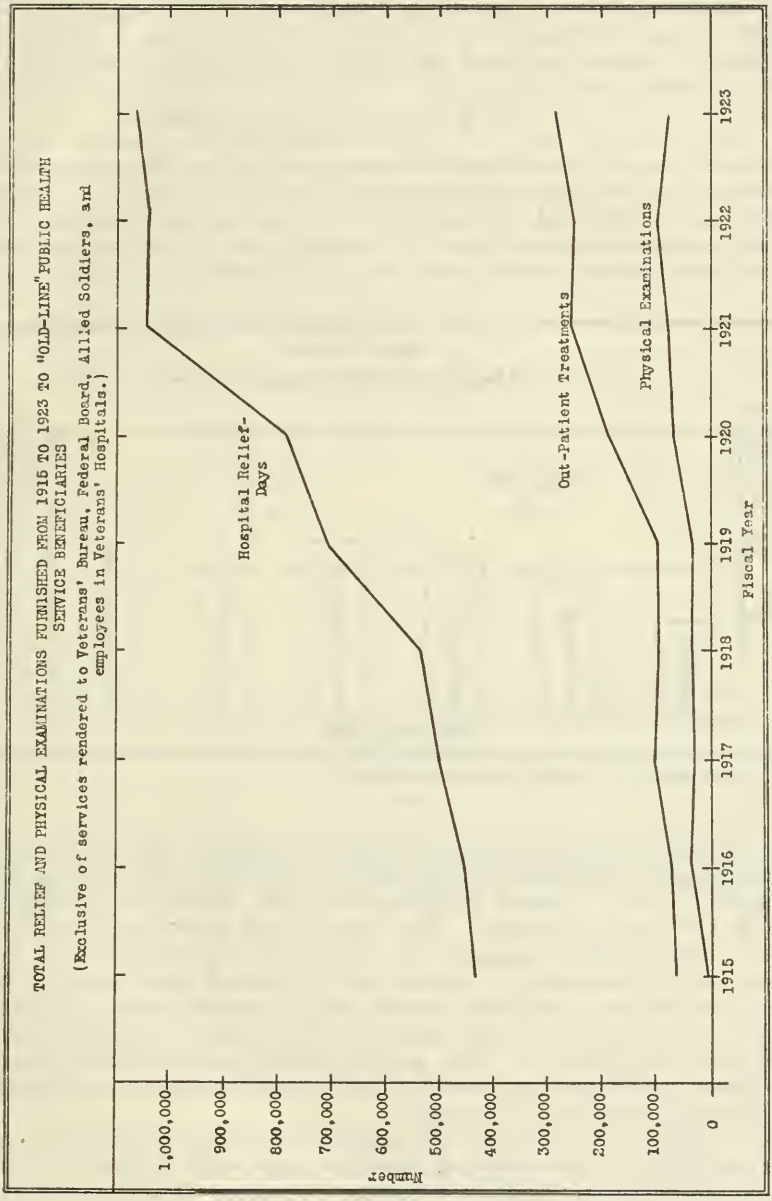
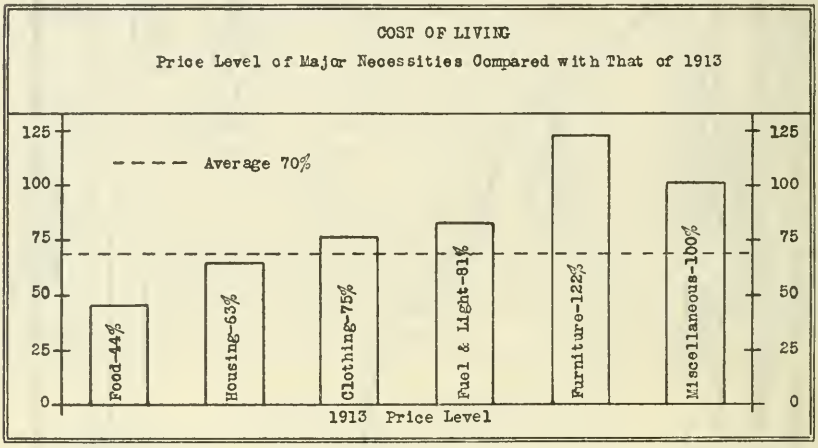

TOTAL RELIEF AND PHYSICAL EXAMINATIONS FURNISHED FROM 1915 TO 1923 TO "OLD-LINE" PUBLIC HEALTH SERVICE BENEFICIARIES
(Exclusive of services rendered to Veterans' Bureau, Federal Board, Allied Soldiers, and employees in Veterans' Hospitals.)
Number
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Hospital Relief-Days
Out-Patient Treatments
Physical Examinations
1915
1916
1917
1918
1919
1920
1921
1922
1923
Fiscal Year

FIG. 1.

COST OF HOSPITAL CARE.

The expenditures out of all Service appropriations for the activities of the Hospital Division, including reimbursements from the Veterans' Bureau, amounted during the year to approximately $5,600,000, or practically five times that of 1913. This is due to the fact that the amount of work has trebled, while at the same time the cost of hospital care has doubled. Not only is the cost of necessities approximately 70 per cent higher than in pre-war periods, according to studies made by the United States Department of Labor (fig. 2), but the improved standards of living now prevailing reflect themselves in every detail of hospital management—in the food, service, appointments, and equipment. Much more is expected and demanded by patients than in pre-war times. The single item in marine hospitals of the female nurse, who is absolutely indispensable, and who, more



Data from U. S. Bureau of Labor Statistics

FIG. 2.

than any other single factor, has served to elevate the standards of hospital care, alone adds approximately $500,000 to the annual cost of medical care. Trained dietitians have also effected a transformation in the hospital cuisine. New methods of treatment have been added. Professional masseurs are now routinely employed in hospitals; and physiotherapy, carried out by trained aides under physicians' supervision, includes hydrotherapy, electrotherapy, thermotherapy, heliotherapy, both natural and artificial, requiring especially trained personnel. New and improved diagnostic instruments have been introduced, expensive to procure and maintain, and requiring the employment of technicians.

The average per diem cost per patient in marine hospitals for the year was $4.08. This compares most favorably with the cost of operation for the civilian hospitals of similar character, as is shown below. The private hospitals studied in this comparison are the following: At Boston, the Peter Bent Brigham, Massachusetts General, and the Massachusetts Homeopathic; at Buffalo, the Buffalo General Hospital, Homeopathic, and Deaconess; at Cleveland, the Lakeside,

Mount Sinai, and St. Luke's Hospitals; at Detroit, the Evangelical Deaconess Hospital; at Louisville, the Norton Infirmary, and the Deaconess and Good Samaritan Hospitals; at Memphis, the Lucy Brinkley and Baptist Memorial; at New Orleans, the Presbyterian Hospital and Touro Infirmary; at New York, the Staten Island Hospital; at Pittsburgh, the Passavant and Pittsburgh Hospitals; and at St. Louis, the Jewish, Barnes, and the Missouri Baptist Sanitarium.

IN-PATIENT COSTS, MARINE HOSPITALS.

For several years the average in-patient per capita per diem cost in United States marine hospitals has been slightly more than $4. This per diem represents the total in-patient operating cost divided by the total number of in-patient days relief furnished, and has no relation to out-patient treatment or expenditures therefor. The per diem as ascertained by the United States Public Health Service cost accounts is accurate and in sufficient detail.

Unsuccessful attempts have been made to accurately compare marine hospital in-patient operating costs with similar costs in private hospitals. Differences in the character of relief furnished and in items of costs included have made an absolute comparison impracticable. The Public Health Service furnishes complete in-patient hospital relief without expense to its beneficiaries. One other hospital has been found which furnishes complete and comparable service, with unimportant exceptions, but does not segregate in-patient and out-patient costs. The total operating expense of that hospital divided by the number of in-patient days relief furnished gives a per diem of $5.74 as compared with $5.22 for the marine hospital in that city and with a much lower average for all the marine hospitals, each average arrived at in the same manner.

In an endeavor to procure a satisfactory comparison of costs the following table of in-patient costs sets forth the principal differences between marine hospitals and private hospitals and, after adjustment, draws a comparison of in-patient per capita per diem costs, with explanatory notes. The result is believed to be sufficiently accurate for the purpose desired and shows the cost in marine hospitals to average $4.08 as compared with $6.10 for like service in a representative group of private hospitals computed upon the same basis.

Comparative per capita per diem costs of in-patient hospital treatment in United States marine hospitals and representative private hospitals.

Service. (As shown by Public Health Service hospital cost accounts.)	United States marine hospitals.		Representative private hospitals—per capita per diem cost, average.	Remarks.
	Per centage of cost, actual average.	Per capita per diem cost, actual average.		
	Per cent.			
Administrative [1] Nursing [1] Dietetics (including farm products) Laundry [1] Indirect cost of supplies Maintenance of grounds and buildings Fuel Light Water Rent Miscellaneous (General expenses.) Clinical laboratory Motor vehicles	82	$3.35	$5.00	The per diems quoted by private hospitals cover these services plus the cost of out-patient service and represent the total expenditures divided by the number of in-patient days. This is the operating cost and not the charge for service. The charge to the patient is usually smaller.
Medical and Surgical Dental service Reconstruction service [1] Special nursing	18	.73	1.10	In the average private hospital these services are purchased by the patient as extras and do not enter into the operating cost. They probably cost patients an average of $2 per diem, but as an operating expense the cost would be less.
Total	100	4.08	6.10	

[1] In marine hospitals the administrative service includes the furnishing of records of much value to the Government; the nursing service is furnished by registered nurses; and laundry service includes patients' clothing, hence the cost should be greater than in private hospitals and partially compensate for the inclusion of out-patient costs in the per diem for private hospitals. Reconstruction includes orthopedic and prosthetic appliances, artificial eyes, etc. There are no extras. The marine hospital relief is complete, including social service, educational work at times, and burial when required.

Marine hospitals include in their cost accounts every item of expense, including water, heat, power, the repair of buildings, the pay of all physicians, attending specialists, trained nurses, and all other personnel. It is evident that the charges made by a civilian hospital to a pay patient do not usually offer a proper basis of comparison, because the private hospital usually furnishes to its clientele only bed, board, and ward nursing. Extra charges are made to its patients by the attending physician or surgeon, for all operative procedures, for a special nurse, and even for dressings and medicines, whereas a marine hospital provides, and includes in its operating costs, all surgical operations and special treatments of every kind. A private hospital, operating a training school for nurses, moreover, secures without charge, or at nominal expense, services for which a marine hospital pays.

Full Use of Facilities.

As an index to the usefulness of United States marine hospitals and their increasing importance to the merchant marine and other beneficiaries, the following specific instances may be mentioned.

The marine hospital at Detroit was built in 1857, with a capacity of 40 beds; its beds were increased in recent years to 78 by utilizing

space originally used for quarters and administrative purposes. The average and maximum numbers of patients during the year were 74 and 87, respectively.

The marine hospital at Pittsburgh was constructed in 1910 for 39 patients. Without additional construction its capacity is now 60 and its average and maximum numbers for the year were 45 and 63, respectively. It has been necessary here, and at several other hospitals, to quarter all medical officers and part of the employees outside the hospital on a commutation status, with resulting increase in the cost of operation.

The marine hospital at Buffalo, constructed in 1909, for 48 patients, had an average of 65 and a maximum of 75 during the year, being usually filled beyond its present rated capacity of 60 by placing extra beds on wards or on verandas.

The hospital at Savannah, built in 1906, for 38 patients, averaged 64 and had a maximum of 93 patients.

The hospital at Port Townsend, Wash., built in 1895, for 65 beds, now has 100, which are nearly always filled. Its average for the year was 94 and its maximum 97. It has been necessary, because of lack of space, to keep from 10 to 20 patients in a contract hospital at Port Townsend, and from 14 to 18 in contract hospitals in Seattle.

The marine hospital at San Francisco was built in 1875 of frame structures, with a capacity at that time of 130 beds. The present hospital buildings should be replaced by modern structures on the present site, and this was anticipated in the estimate transmitted February 20, 1923, by the Secretary of the Treasury to the chairman of the Public Buildings and Grounds Committee for new construction necessary for additional marine hospitals and rehabilitation of various stations. During the year just past this hospital was often filled beyond its present rated capacity of 286 patients, the average and maximum for the year being 276 and 319, respectively.

The marine hospital at Mobile, built in 1837, with a capacity of 30, but later enlarged, had for the year an average and maximum of 71 and 80, respectively.

The marine hospitals at Louisville, Ky., Evansville, Ind., St. Louis, Mo., and Memphis, Tenn., with bed capacities of 60, 48, 70, and 50, respectively, had maximum patient populations of 65, 53, 63, and 46, respectively, at various times during the year. Even the marine hospitals at Vineyard Haven, Mass., and Key West, Fla., which are small institutions but necessary to supply facilities which, in the absence of these hospitals, would be lacking at these places, were, at various times during the year, filled to operating capacity. A list of all the hospitals and a tabulated statement of their chief activities appear in Table II, page 227.

The large marine hospitals at Baltimore, Boston, Chicago, New Orleans, Norfolk, and Stapleton are devoted to general medical and surgical work.

Casual study of the sources, in various seaports, from which seamen of the merchant marine seek medical advice and treatment shows that the Public Health Service is not only the official but the only agency commonly utilized. At Boston and New York it is ascertained that approximately 95 per cent of all American seamen needing medical relief are treated at the United States marine hospitals or their outpatient offices. At the Norfolk hospital patients were received from

580 different vessels out of a total of approximately 675 ships entering the port. It was ascertained at Chicago, and this is probably true of other places, that vessels from which no patients were received during the year were those entering the port once or only occasionally during a season.

Marine Hospitals Devoted to Special Purposes.

Fort Stanton.—The United States marine hospital at Fort Stanton, N. Mex., is devoted to tuberculous patients. Admissions are limited as far as possible to the class of tuberculous patients that long experience has shown to be most benefited there. Considerable care is necessary in the selection of patients, because of the fact that the station is located more than a mile above sea level and because its facilities are adapted to the care of ambulatory rather than bed patients. Selections for transfer, therefore, are limited to subjects with early or moderately advanced disease and without serious complications. Hospital Division Circular 218, of July 12, 1922, applies to the selection of patients for transfer. Of the 343 tuberculous patients remaining in all hospitals of the service on June 30, 1923, 199 were at Fort Stanton and 144 in the tuberculosis wards of other marine hospitals. The remaining tuberculous patients, 58 in number, were scattered in various civilian institutions with which the service has contracts in the continental United States and insular possessions. These figures relate only to hospital patients and not to tuberculous patients given out-patient relief at various stations during the year.

Fort Stanton, which has a reservation of 43 square miles, maintains a beef and dairy herd of nearly 1,800 head and produces all the beef and milk consumed at the station, amounting during the past fiscal year to 105,000 pounds of beef and veal produced at 15 cents per pound, 77,439 pounds of pork, including cured hams and bacon, at 12 cents per pound, and 56,991 gallons of 5 per cent butterfat milk at 32 cents per gallon. This station shipped 150 head of cattle to the United States Marine Hospital No. 66 (National Leprosarium) at Carville, La., and will be able to supply most of the beef consumed there by shipments of grass-fat stock from time to time.

Three hundred and ninety tuberculous patients were treated at Fort Stanton during the year, the daily average being 211 and the maximum 222. The average stay of patients discharged was 362 days. It is interesting to contrast this with the marine hospital at Ellis Island, devoted to immigrants, where the average stay was 11½ days, and with the marine hospital at Stapleton, devoted largely to acute surgical cases, where the average stay, exclusive of patients in the tuberculosis ward, was approximately 16 days. From Table VII, page 240, it is seen that the number of hospital days relief furnished discharged tuberculous patients amounted to 177,829, which is larger than that for any other disease, including the total aggregate for the three venereal diseases, which is next in order of importance and amounted to 151,804.

For treatment, reliance is still being placed at Fort Stanton in the well-known principles of rest, food, unlimited ventilation, and properly applied graduated exercises. Heliotherapy, both natural and artificial, and artificial pneumothorax are, however, used with encouraging results.

Ellis Island.—The marine hospital at Ellis Island is devoted almost exclusively to arriving aliens and foreign seamen, although it is utilized to accommodate the overflow from the other two marine hospitals in New York City. A total of 11,803 patients were treated at the Ellis Island Hospital during the year, representing people born in 72 different countries. The maximum number of hospital patients during the year was 558. The rated capacity of the hospital is 600, but the demands made upon it are seasonal and vary greatly from week to week. There were 129 deaths and 30 births during the year. The extent of the demand for diagnostic facilities at this hospital is indicated by the fact that 5,500 Wassermann tests were made, and 23,298 other laboratory examinations carried out.

Reimbursements, amounting to $107,377.50, were paid to the Bureau of Immigration for light, heat, power, water, and telephone service. Bills against steamship companies for the care of detained immigrants amounted to $232,677.60, which amount was covered into the Treasury.

Carville, La.—The marine hospital at Carville, La. (National Leprosarium), has been kept filled to the utmost limit of its capacity during the year. This institution, formerly the Louisiana State Leper Home, which was purchased January 3, 1921, was increased by the Public Health Service from 80 beds to 173, all beds being immediately filled from the waiting list as soon as ready. Congress, by the act of February 20, 1923, has appropriated $650,000 for additional buildings, which will increase the bed capacity to approximately 500. The Supervising Architect, Treasury Department, is proceeding with plans for the new construction, upon completion of which it will be practicable to apply a general policy for the segregation of lepers in the United States, in accordance with the act of February 15, 1893 ("An act granting additional quarantine powers and imposing additional duties upon the Marine Hospital Service"), and that of February 3, 1917, Public No. 299 ("An act to provide for the care and treatment of persons afflicted with leprosy and to prevent the spread of leprosy in the United States"), and in conformity with the intent of the interstate quarantine regulations of 1912. At the present time proper facilities are lacking to detain unwilling lepers, but the great majority of patients at Carville are contented and law-abiding citizens, with no wish to violate quarantine regulations and earnestly desiring to avoid exposing others to infection.

There were only nine desertions from Carville during the year. It is remarkable that of these seven were ex-service men, who had accumulated considerable sums of money from compensation or pension. In one instance a deserter from the hospital, returning after several months' absence, found $1,500 accumulated compensation and again immediately absconded. Obviously, it will be necessary to apply certain precautions against desertions when facilities are available. At the present time, however, the small number of vacancies occurring are immediately filled from the waiting list of lepers anxious to be admitted in the order, so far as it is possible to determine, of the degree of hazard to the general public presented by the individual through ulcerated lesions and unfavorable living conditions in contact with others.

The reservation at Carville consists of 358 acres of land beautified by ample lawns, live-oak trees, flowers, and flowering shrubs. Patients,

segregated by sexes, live in 11-room cottages. There are two chaplains, representing the Catholic and the Protestant faiths, respectively, and two chapels. For recreation three moving-picture shows are given weekly, two at Government expense and one upon the initiative and at the expense of the patients themselves, who also have a brass band, a club room, general store, and tennis courts. A full-time dentist is employed here exclusively for the care of leper patients. Seventy-three patients were treated with chaulmoogra oil and others by the X-ray with encouraging results. Surg. (R.) O. E. Denney, in charge of the institution, an officer with long experience in the care of lepers both in the United States and the Philippines, is carrying out important research work and therapeutic investigations. In addition to the numerous mutilations which lepers suffer through loss of digits and portions of the hands and feet from ulceration and atrophic lesions, the eyes are involved in a large percentage of cases. Of 172 lepers under treatment at Carville 22, or 13 per cent, of the number are totally blind, and in only 30 per cent is vision unimpaired.

New York City (Hudson Street).—This is an emergency hospital, purchased by the Government in 1919, and remodeled to accommodate the enormous out-patient demands centered here, with a 24-hour day service. Its diagnostic facilities include the latest developments in X-ray and other laboratory apparatus, and its equipment for treatment includes complete hydrotherapy and other forms of physiotherapy and a dental clinic of four chairs. There are beds for 23 patients and complete operating room facilities to meet any emergency. Patients able to be removed are soon transferred to the marine hospital at Stapleton. Three ambulances are operated.

Four branch out-patient offices are operated by this hospital—at the barge office; the Army base, Brooklyn; the post office, Thirty-third Street; and the Seamen's Church Institute, 25 South Street, respectively. It also handles, at a branch office in the customhouse, all the work for that port in cooperation with the prohibition unit for the issuance of certificates of need for medicinal liquor on ships.

A total of 20,818 patients and out-patients were treated at this hospital and its branch offices during the year and 70,083 out-patient treatments furnished, including 2,930 intravenous administrations of salvarsan, which is given to special night classes of service beneficiaries from ships in port.

TABLE A.—*Classification of out-patient treatments furnished at United States marine hospitals and other relief stations, fiscal year 1923.*

Stations.	General medical.	Dental.	Eye, ear, nose, and throat.	Neuro-psychiatric.	Tuberculous.	Genito-urinary.			X-ray.	Physiotherapy.	Total.
						Surgical.	Venereal.	Non-venereal.			
Marine hospitals	41,351	13,002	20,859	18	240	56,490	29,162	6,916	305	24,393	192,736
Other relief stations	46,582	3,170	5,899	182	275	40,435	14,104	392	164	6,077	117,280
Total	87,933	16,172	26,758	200	515	96,925	43,266	7,308	469	30,470	310,016

Out-Patient Relief.

The classification and general character of out-patient treatments are seen in Table A. Reports by stations appear in Table II, page 227.

Dentistry.

Twelve of the largest marine hospitals and one other relief station now have full-time dental officers and complete equipment. There are on duty at these stations at the time of this report, 23 full-time dental operators, as follows: One senior surgeon (R.), 1 surgeon (R.), 7 passed assistant surgeons (R.), 3 assistant surgeons (R.), and 11 acting assistant surgeons. Wherever the importance of operations justifies it, nurses have been assigned to duty in the dental clinics.

During the year, service patients have been given 6,648 complete dental examinations, 5,304 prophylactic treatments, 9,942 extractions, 6,921 amalgam and gold fillings, 2,208 silicate cement fillings, and 3,562 prosthetic appliances have been made. The above treatment was rendered at an overhead expense of $85,898.61, which includes the cost of all supplies, salaries of officers and employees, and 10 per cent depreciation per annum and 6 per cent interest on the cost of all purchased dental equipment. Had this treatment been rendered by contract dental surgeons on a fee basis, at the usual commercial rates, the cost would have been $182,901. This shows a net saving of $97,002.39 for the fiscal year from the amount which would have been expended had the same amount of treatment been rendered by civilian dentists. Not only is this dental treatment of financial advantage, but the assignment of dental operators to the larger hospitals makes it possible for the latter to have an expert dental diagnosis in certain cases and particular kinds of treatment not otherwise obtainable.

During the last fiscal year the number of United States employees' compensation cases which were referred to the United States Public Health Service for dental examination and treatment have increased to a very large number.

Statistics and Clinical Records.

A bureau register is maintained of all hospital patients, grouped by hospitals and in alphabetical order, on Form 1971–F report cards, which furnish a history of each case.

During the period when large numbers of veterans were in hospitals, an elaborate system of clinical records was necessary, including the coding and punching of data from Form 1971–F cards for mechanical tabulation. At present a much simpler system is in use, whereby data for discharged patients are recorded on punch cards. This has made possible the statistical tables included in this report, showing the diagnoses, causes of death, etc. (see p. 233 to 237). Much other information, which is being recorded on the punch cards, can not be given in this report, but will be a basis for future clinical study after a large number of cards have accumulated.

A measure of the routine activities of the marine hospitals and relief stations may be found in the number and character of surgical

operations performed. There was a total of 20,893 such operations, besides 24,349 intravenous injections of arsphenamine (salvarsan) and neoarsphenamine (neosalvarsan). There were 456 appendectomies, and a total of 157 other abdominal operations, 1,286 operations for hernia of which 1,247 were of the inguinal variety, 176 operations upon the eye, 246 upon the nose, and 1,348 for removal of tonsils and adenoids. The routine laboratory procedures carried out in the various marine hospitals included more than 25,000 Wassermann tests, 53,000 microscopic examinations, and a grand total of approximately 120,000 examinations of all kinds.

United States Veterans' Bureau.

The emergency having passed wherein the Public Health Service was made chiefly responsible for hospital and medical care of patients of the United States Veterans' Bureau, the care of veterans has become a minor item in marine hospitals, the number of such hospital patients having been reduced from 475 to 186. The facilities of this service are, however, constantly at the disposal of the Director, United States Veterans' Bureau, who has continued to utilize marine hospitals in cities where there is no United States Veterans' Bureau hospital, as in Buffalo, N. Y., Cleveland, Ohio, Detroit, Mich., Evansville, Ind., Louisville, Ky., Pittsburgh, Pa., Portland, Me., and Savannah, Ga. A total of 126,332 hospital relief days were provided, for which the United States Veterans' Bureau reimbursed the Public Health Service at cost rates. The various out-patient offices, as well as the dental and laboratory facilities, are also utilized at the pleasure of the Director of the Veterans' Bureau, and in Porto Rico and Alaska the Public Health Service continues to be the official agency whereby the Veterans' Bureau provides medical care for all its patients.

Surplus equipment and supplies in stock at North Chicago, Ill., and Federal Park, Md. (Perryville), were divided in accordance with the provisions of Executive order of April 29, 1922. Through the courtesy of the Director, Veterans' Bureau, two large storehouses were assigned the Public Health Service at Federal Park, to which were transferred such part of its share as it will be practicable to utilize in the marine hospitals.

United States Coast Guard.

The Public Health Service is alone responsible for supplying medical care of every character to the personnel of the Coast Guard, numbering 4,684 persons, which is distributed among 75 craft of all kinds and 325 life-saving stations.

On June 30, 1923, there were detailed for medical duty with the Coast Guard, 1 surgeon, 3 passed assistant surgeons, 3 assistant surgeons, 7 acting assistant surgeons, and 93 contract surgeons, the latter supplying medical service to Coast Guard stations remote from marine hospitals and relief stations. A dental officer accompanies the Bering Sea patrol and makes his headquarters at Unalaska during the season. In addition to these details, the entire resources of marine hospitals and other relief stations, including dental facilities, are constantly available to Coast Guard personnel. An aggregate of 41,681 hospital

days' relief, 27,777 out-patient treatments, and 4,207 physical examinations were provided during the year.

Medical supplies and medical and surgical equipment, as well as medical officers, are furnished by the Public Health Service for the cruising cutters and the Coast Guard depot. Several of the large cutters are equipped for surgical operations, and are supplied with the necessary drugs and surgical stores, including vaccines and diphtheria antitoxin, for the assistance of vessels in distress, the natives of Alaska, the fishing fleet, or for relief of an emergency nature. The Bering Sea patrol and the Atlantic ice patrol, the former consisting of 4 cutters and the latter of 2, are particularly well supplied with medical and surgical equipment, vaccines, and antitoxins; and each carries a competent surgeon. Two laparotomies, one for appendicitis and one for a gunshot wound, were performed while in the Bering Sea. Both patients recovered.

In addition to the ordinary medical and hospital work, service medical officers have served on 51 Coast Guard retiring boards and 23 other medical boards. Of 151 applicants for cadetship, 43 were passed and 108 rejected. Of 4,207 examinations for enlistment, 1,521 were passed.

Arrangements have been made, through the courtesy of the Bureau of Aeronautics, United States Navy, whereby naval aircraft and pilots will convey medical officers from the marine hospital at Norfolk, Va., to respond to emergency calls from the isolated Coast Guard stations of Cape Hatteras and the North Carolina coast. These stations are not readily accessible by ordinary means of travel, and grave emergencies sometimes arise, necessitating immediate surgical intervention.

United States Steamboat Inspection Service.

Visual examinations.—For more than 25 years all applicants for licenses as master, mate, pilot, or engineer have been examined by officers of the Public Health Service for vision, color vision, and hearing. It is, of course, necessary to insure that all personnel responsible for the navigation of vessels have normal vision and hearing, because the safety of vessels and the lives of their personnel depend upon keen eyes and ears and a prompt interpretation of signals. During the year, 4,973 examinations of this character were made, of which 4,908 were passed and 65 rejected.

Examination and instruction in first aid.—Pursuant to Rule V, section 1, of the General Rules and Regulations prescribed by the Board of Supervising Inspectors, Steamboat Inspection Service, Department of Commerce, which was made effective July 1, 1922, licensees are also required to be familiar with the principles of first aid. The wisdom of this requirement is evident when it is recalled that, of approximately 27,000 vessels of all classes included in the American merchant marine, only a very small number of passenger vessels, such as the *Leviathan*, the *George Washington*, and the *American Legion* carry medical officers, although certain vessels of American registry are required to carry a chest of medicines. On other ships, especially slow freighters and fishing vessels that do not touch port for several weeks at a time, ship's officers, if skilled in the principles

of first aid, are able to ameliorate the suffering often occasioned by serious accident or sudden illness and to carry out directions which may be received by radio.

Officers of the Public Health Service charged with the responsibility of conducting examinations in first aid of applicants for licenses who are referred by the Steamboat Inspection Service are also required to conduct classes of instruction to those desiring to attend. Examinations in first aid and facilities for giving instruction are provided at 43 stations, which correspond to local offices of the Steamboat Inspection Service. The lectures and demonstrations cover such matters as resuscitation of the apparently drowned, control of hemorrhage, treatment of poisoning, aseptic treatment of wounds and fractures, transportation of injured, segregation for infectious diseases, disinfection, emergency nursing, pure water, etc. Applicants devote themselves with assiduity to the necessary course of instruction, because success in passing the tests is a prerequisite to obtaining a license. During the year 2,190 applicants were examined, of whom 1,896 passed and 294 were rejected, the rejections being because of insufficient knowledge of the subject. Instruction was given to 1,650 attending the classes.

Medical Advice by Radio to Ships at Sea.

This service was initiated through the cooperation of the Seamen's Church Institute and the Radio Corporation of America. Both Government and commercial radio service send these messages gratis. The marine hospitals especially designated to furnish advice upon request at all hours are those located in New York City, Key West, New Orleans, and San Francisco, although any relief station receiving a request to it direct will respond when facilities are available.

The volume of this work is growing, and marine hospitals are sometimes called upon by ships at sea to send an ambulance or a medical officer to a designated place to meet a small boat sent ashore with a sick man, or even to arrange, through the courtesy of pilot boats, Coast Guard cutters, or lighthouse tenders, to meet a vessel offshore to remove sick or injured.

Physical Examinations for the Civil Service Commission.

Since October 30, 1913, when the Civil Service Commission first requested the Secretary of the Treasury to provide physical examinations for civil service applicants, the Public Health Service has furnished this service, nearly 3,000 such examinations having been made annually. A complete physical examination by a Government medical officer has certain advantages over one made by a family physician. A thorough examination is in line with modern principles for the early detection and timely correction of physical defects, and calculated to prevent accident for which the Government might subsequently be required to pay compensation. Obviously an employee with seriously defective vision or hearing or with some grave physical disability is more liable to accidental injury in certain employments where the industrial hazards are considerable than one physically sound.

Pursuant to the general policy outlined above, and for the purpose of applying it more completely, the Executive Order of June 18, 1923, was promulgated:

EXECUTIVE ORDER.

THE WHITE HOUSE,
June, 18, 1923.

With the view of promoting health and efficiency and of minimizing accidents among Federal employees, the Surgeon General of the Public Health Service is authorized and directed to make such physical examinations of applicants and employees as may be requested by the Civil Service Commission, and shall keep the commission advised of the localities where medical officers are available for duty.

(Signed.) WARREN G. HARDING.

UNITED STATES EMPLOYEES' COMPENSATION COMMISSION.

The obligations by the United States Government to pay compensation to such of its civil employees (now totaling more than 500,000) as may be injured as a result of employment, necessarily calls for a large amount of medical work, which is, from its nature, best performed by Government medical officers rather than by family physicians or others privately employed.

The Public Health Service continues to be the principal medical agent for the commission in all regions where there is a marine hospital or other relief station. A permanent board of three service officers is also available to assist the Employees' Compensation Commission in deciding under what circumstances compensation should be paid by the Government for industrial diseases resulting from employment. During the year, 1,447 patients of the Employees' Compensation Commission were given a total of 42,542 hospital relief days; 26,722 out-patients were given 91,144 treatments, and 12,288 physical examinations were made for purposes of determining compensation. Many of these examinations are of such a nature as to demand all the laboratory and other diagnostic means commonly employed by medical science to assist in adjusting difficult points at issue in the claims.

In the fifth and sixth annual reports of the Employees' Compensation Commission the value of the medical facilities provided by the Public Health Service was estimated at approximately a million dollars annually. The chairman, in a communication dated August 21, 1923, states in part, as follows:

> It may not be immaterial to further state that the Commission has, in general, been unable to obtain, without regard to cost, from private hospitals, the full reports of physical findings and examinations regularly sent in by marine hospitals. The further advantage that, in the last 5 years, Public Health Service surgeons have acquired a knowledge of compensation details, makes their reports superior to those of civilian physicians for the proper adjudication of claims by the Commission, and makes it quite impossible to estimate in dollars and cents the actual value of the service of the marine hospitals and dispensaries.

CONSTRUCTION AND REPAIRS.

Since July 1, 1922, Constructing Engineer David C. Trott has been detailed from the office of the Supervising Architect, Treasury Department, to take charge of matters relating to maintenance, repairs, and new construction at marine hospitals. Major improvements during the year include an additional wing for 104 beds at Norfolk and a

new laundry building, completed and equipped, at New Orleans, both out of special appropriations for construction and repairs. The construction of the addition for 85 beds to the marine hospital at Savannah, Ga., is 50 per cent completed. With station labor, trees and shrubs numbering 600 were obtained locally without expense to the service and planted on the grounds of the marine hospital at Boston, which were further beautified by the releveling and seeding of lawns and planting of flower beds.

The hospitals have, however, fallen into a state of disrepair. As stated in the annual report for 1922:

> There is nothing more urgent than the reconditioning of these hospitals from a physical point of view. * * * As soon as possible every effort should be made to secure the necessary funds to put these hospitals into condition.

Most of the hospitals are old and many of them are discreditable to the National Government. The estimates made at the beginning of the fiscal year, approved by the Supervising Architect and transmitted on September 15, 1923, by the Secretary of the Treasury to the Director of the Budget, aggregated $360,200. Of this amount, $15,000 only was allowed, as a consequence of which the customary annual appropriation of $125,000 for repairs and preservations and $60,000 mechanical equipment for marine hospitals, quarantine stations, and the Hygienic Laboratory were wholly inadequate for the proper upkeep of the stations. Surplus materials obtained from the War Department alleviated acute conditions to a certain extent; but serious deterioration of buildings has been inevitable. The amount necessary for major repairs for the next fiscal year, therefore, is $570,000. These estimates, which were made by the Supervising Architect, will be presented to the Secretary of the Treasury for transmission to the Director of the Bureau of the Budget.

A request, based upon estimates made by the Supervising Architect, for major items of new construction and replacements, including proposed new marine hospitals at Seattle, Wash., and a point in Texas, respectively, and replacements at San Francisco, New Orleans, and Detroit, with additions at Stapleton, Mobile, Fort Stanton, Chicago, and other hospitals, and the quarantine stations, aggregating $8,768,500, was transmitted on February 20, 1923, by the Secretary of the Treasury to the Congress. Although the clinical work carried out in the various hospitals is believed to compare favorably with the best class of private hospitals, the physical condition of the buildings, many of which are more than 50 years old, is discreditable to the Government and calculated to increase the cost of operation above normal.

MEDICINAL LIQUOR ON UNITED STATES AND FOREIGN VESSELS.

Under the provisions of Treasury Decision 3484, issued by the Commissioner of Internal Revenue and approved by the Secretary of the Treasury June 2, 1923, the Public Health Service is the governmental agency for the issuance of certificates of need for medicinal liquor for foreign and domestic vessels in United States ports. The procedure became effective June 10, 1923.

Under the provisions of Bureau Circular 406 and supplements thereto, promulgating Treasury Decision 3484 to the officers of the Public Health Service, the duty devolves upon medical officers in

charge of United States marine hospitals and service relief stations of issuing, upon application of the master, a certificate of medicinal need upon Internal Revenue Form 1539, specifying the quantities and kinds of liquor required on board for medicinal purposes and legalizing the possession thereof. The certificate includes an authority to purchase on certain conditions in amounts less than 5 gallons.

NARCOTICS FOR VESSELS.

The service continues to function under the provisions of Treasury Department Circular No. 48 of June 21, 1915, in approving purchase orders for narcotics for stocking medicine chests and dispensaries maintained on board vessels. In the absence on board of a physician registered under the act of Congress approved December 17, 1914, purchases of narcotics may be made for ocean-bound vessels, vessels engaged in trade between ports of the United States, and vessels belonging to the various departments of the Government upon the approval of a commissioned medical officer or of an acting assistant surgeon of the service.

This work has been performed since the date of the department circular mentioned as one of the functions necessary to enforce the Federal antinarcotic law, with special reference to vessels not rating a physician.

The Nursing Service.

The nursing service, of which Miss Lucy Minnigerode is superintendent, is described here for purposes of convenience, its major operations being included in those of the hospital division. It pertains, however, to other divisions. Eleven nurses are employed in the division of domestic quarantine, chiefly in trachoma investigations; nine are employed in the division of scientific research, the majority of these in industrial hygiene; one nurse is employed in the venereal disease division for special educational work; and 11 are employed in the division of foreign quarantine at New York, Boston, Gloucester, and San Francisco, respectively, where they are necessary for the delousing of female immigrants, care of the sick detained patients, and for general nursing work. A quarantine hospital is maintained at Hoffmans Island, New York quarantine, with four nurses on permanent duty there. This number is necessary to meet emergencies arising suddenly from time to time, although it is difficult to keep the personnel contented, because of the isolation and because very arduous periods are alternated with periods of inactivity—conditions fostering discontent.

The work of the nursing section is now carried on by one superintendent, one assistant superintendent, and one clerk. All professional women (nurses, aides, and dietitians) are now included in this section, with the exception of women physicians, and the work involves the dietetic, physiotherapy and occupational-therapy departments, and hospital libraries.

The superintendent of nurses has inspected and reported on the nursing service in the majority of the hospitals in the East and Middle West during the past year. She visited the stations at San Francisco and Port Townsend, and at that time represented the service at the convention of the American Nurses' Association in

Seattle. She also represented the service at the Michigan State Nurses' Association meeting at St. Joseph, Mich., at which time she inspected stations of the service, and was at the meeting of the National League of Nursing Education in Boston.

Many papers have been prepared during the year and published, among them one designed to interest the women of other American Republics of the proper type in nursing as it is established in the United States. This was translated and published in the July issue of the Pan American Bulletin.

Hospitals and relief stations.—Out of a total of 359 nurses, 326 are detailed to hospitals and other relief stations, together with 27 dietitians, 42 aides, and 5 librarians. Of the nurses now in service, 72 have been in for less than a year, all others for over a year. Thirty-five have taken postgraduate courses. There have been 86 new appointments of nurses during the year, 89 reinstatements, and 36 promotions. Nurses from 40 States and 237 training schools are on duty, the largest representations appearing as follows:

New York	49 nurses from 27 hospitals.
Pennsylvania	31 nurses from 27 hospitals.
Massachusetts	29 nurses from 20 hospitals.
Illinois	23 nurses from 14 hospitals.

States not represented include Idaho, Wyoming, Oklahoma, Arizona, Nebraska, and Nevada.

In the quota of 326 nurses are included the 12 Sisters of Charity at the leprosarium at Carville, La., at which station a Sister of Charity also serves as dietitian. The service rendered by these Sisters has been excellent.

All nurses in the service are required to be citizens of the United States, but there are 8 Canadian born, 5 English, 7 Irish, 1 Italian, 1 Swedish, 1 Mexican, and 2 from the British West Indies. There were 148 resignations during the year, of whom 21 entered the Veterans' Bureau, 58 accepted positions outside the Government, 19 were married, and 15 resigned because of ill health. Nine were discontinued as not meeting the requirements of the service and six on account of reduction of personnel.

The question of proper quarters, which has been of such importance heretofore, is practically adjusted, and serves to stabilize the service. Quarters have been furnished at the marine hospitals in Baltimore, Boston, Detroit, Evansville, Fort Stanton, Louisville, Memphis, New Orleans, Pittsburgh, Portland, and Norfolk. Quarters are leased at Buffalo, Chicago, Mobile, Savannah, Key West, and Hudson Street, New York City. At Cleveland, nurses are allowed to secure their own quarters for a sum not to exceed $25 a month. At Louisville, however, quarters are not entirely satisfactory, and at Baltimore and Stapleton they are inadequate and supplemented by rented houses. Construction of quarters at Chicago will be undertaken shortly.

The employment of dietitians has been continued and is most satisfactory. Dietitians have rendered exceptional service at a very low per capita cost for an unusually good ration. With the exception of the New York group of hospitals, where coordinated buying is effected through a coordinator's office, dietitians have acted as purchasing agents and have been responsible for the purchasing and selection of all foods and kitchen supplies. There are 27 dietitians

on duty in the marine hospitals. There were 8 resignations during the year, 5 to accept better positions, and 1 because of ill health.

There are 42 aides on duty in the marine hospitals. Thirty-five resigned during the year, 8 went to the Veterans' Bureau, 3 failed to meet civil-service requirements, 3 married, 8 were discontinued on account of reduction of personnel, and 7 resigned because of ill health.

During the past year occupational therapy has been discontinued in a number of the marine hospitals, including those at Stapleton, New Orleans, Detroit, Cleveland, and Chicago. Present beneficiaries of the Public Health Service, except those at special hospitals, such as Fort Stanton, N. Mex., and Carville, La., remain in the hospital for comparatively short periods; consequently, occupational therapy is not generally indicated, except where Veterans' Bureau patients are still hospitalized. Physiotherapy has been developed, however, in most of the stations, as its need has been made apparent. The development of the library service has continued. Full-time librarians are employed in only two hospitals, Ellis Island and Stapleton, respectively, while Detroit, Boston, and San Francisco have part-time librarians. The other hospitals depend for their library service on other station employees. Some new books have been issued to most stations, and it is believed that the hospitals are now fairly well supplied with books, which vary in numbers from 2,000 volumes in a hospital of 300 beds to 100 in smaller hospitals.

Social hospital workers are employed at Ellis Island to meet special indications in handling immigrants. The necessity for these workers has been fully demonstrated. In all hospitals outside of New York City this service is performed by civilian agencies, without expense to the Government, the American Red Cross serving stations where ex-service men are hospitalized and the Knights of Columbus, Young Men's Christian Association, Seamen's Church Institute, and other civilian agencies acting elsewhere.

During the last four years the nursing service of the Public Health Service has become favorably known to nurses throughout the country, who have appreciated the establishment and maintenance of high standards. This has resulted in an increasing loyalty, efficiency, and stability in this corps of professional women. The reclassification act having passed, adjustments, which will be necessary under the personnel board, are urgent matters since in a proper adjustment of salaries a solution of certain difficulties will be found. Legislation is necessary to increase the pay of nurses and other professional women employed by the Public Health Service to meet the salaries already established for the nurse corps of the Army and the Navy. It is desirable that legislation should follow the line of the act which established the Navy Nurse Corps, with the inclusion of a paragraph providing for recognition of previous service in the Army, Navy, or Public Health Service in connection with the pay periods.

TABLE I.—*Number of patients treated annually,*[1] *1868 to 1923.*

Fiscal year.	Sick and disabled patients furnished relief.	Fiscal year.	Sick and disabled patients furnished relief.
Prior to reorganization:		After reorganization—Continued.	
1868	11,535	1896	53,804
1869	11,356	1897	54,477
1870	10,560	1898	52,709
After reorganization:		1899	55,489
1871	14,256	1900	56,355
1872	13,156	1901	58,381
1873	13,529	1902	56,310
1874	14,356	1903	58,573
1875	15,009	1904	58,556
1876	16,808	1905	57,013
1877	15,175	1906	54,363
1878	18,223	1907	55,129
1879	20,922	1908	54,301
1880	24,860	1909	53,704
1881	32,613	1910	51,443
1882	36,184	1911	52,209
1883	40,195	1912	51,078
1884	44,761	1913	50,604
1885	41,714	1914	53,226
1886	43,822	1915	55,782
1887	45,314	1916	58,357
1888	48,203	1917	64,022
1889	49,518	1918	71,614
1890	50,671	1919	79,863
1891	52,992	1920	110,907
1892	53,610	1921	144,344
1893	53,317	1922	153,633
1894	52,803	1923 [2]	126,956
1895	52,643		

[1] These figures do not include patients treated in connection with veterans' relief activities of the service a follows: 1918, 192; 1919, 13,856; 1920, 279,036; 1921, 667,832; 1922, 242,379; and 1923, 9,704.

[2] The number of patients treated during this fiscal year is only apparently smaller than in previous years, because in prior years out-patients receiving continued treatment were tabulated as additional patients in each month in which they were treated. This duplication has now been eliminated.

TABLE II.—*Transactions at United States marine hospitals and other relief stations, fiscal year 1923.*

Location.	Total number of patients treated.[1]	Total number treated in hospital.	Died.	Remaining in hospital June 30, 1923.	Number of days' relief in hospital.	Number of patients furnished office relief.[1]	Number of times office relief was furnished.	Number of physical examinations.
Grand total	136,660	39,109	821	2,905	1,189,869	97,551	310,016	77,438
FIRST-CLASS STATIONS.								
MARINE HOSPITALS.								
1. Baltimore, Md.	3,003	990	21	121	41,835	2,013	6,133	1,186
2. Boston, Mass.	3,479	1,277	22	117	55,263	2,202	6,764	1,162
3. Buffalo, N. Y.	2,987	617	12	65	23,677	2,370	9,648	1,142
5. Chicago, Ill.	15,221	812	23	103	41,117	14,409	34,969	1,433
6. Cleveland, Ohio	1,952	861	22	55	23,226	1,088	3,206	1,411
7. Detroit, Mich.	2,405	704	17	68	27,173	1,701	5,242	474
8. Evansville, Ind.	542	484	12	27	14,545	58	161	560
9. Fort Stanton, N. Mex.	633	390	32	200	77,183	243	430	32
10. Key West, Fla.	495	278	3	15	7,740	217	371	81
11. Louisville, Ky.	701	532	10	39	17,868	169	1,393	215
12. Memphis, Tenn.	1,066	418	8	15	8,431	648	1,673	881
13. Mobile, Ala.	1,648	800	17	76	25,803	848	2,862	2,326
14. New Orleans, La.	5,195	2,147	40	160	65,281	3,048	11,378	9,150
15. Pittsburgh, Pa.	1,164	495	14	43	16,908	669	7,967	964
16. Portland, Me.	757	419	6	34	13,587	338	498	399
17. Port Townsend, Wash.	881	801	19	101	40,332	80	131	28
18. St. Louis, Mo.	1,003	335	30	35	18,206	668	2,051	503
19. San Francisco, Calif.	7,365	2,156	67	311	108,130	5,209	16,790	3,218
20. Savannah, Ga.	1,703	730	22	72	27,323	973	2,368	698
21. Stapleton, N. Y.	3,246	2,467	70	236	92,140	779	2,040	216
22. Vineyard Haven, Mass.	253	128	8	21	6,127	125	202	16
43. Ellis Island, N. Y.	11,878	11,803	129	181	134,414	75	117	15
66. Carville, La.	218	192	10	172	62,736	26	145	41
70. New York City, N. Y.	20,818	510	9	22	7,335	20,308	70,083	20,873
82. Norfolk, Va.	3,893	1,590	35	133	48,951	2,303	6,114	1,468
Total	92,506	31,939	658	2,422	1,005,331	60,567	192,736	48,492
SECOND, THIRD, AND FOURTH CLASS STATIONS, ETC.								
200. Albany, N. Y.	48	18	1		477	30	112	121
201. Apalachicola, Fla.	119	17			191	102	321	
202. Ashland, Wis.	110	42		1	735	68	84	48
203. Ashtabula, Ohio.	240	14		1	295	226	312	230
204. Astoria, Oreg.	111	19		3	497	92	173	84

[1] See note 2, Table II.

TABLE II.—*Transactions at United States marine hospitals and other relief stations, fiscal year 1923*—Continued.

Location.	Total number of patients treated.	Total number treated in hospital.	Died.	Remaining in hospital June 30, 1923.	Number of days' relief in hospital.	Number of patients furnished office relief.	Number of times office relief was furnished.	Number of physical examinations.
SECOND, THIRD, AND FOURTH CLASS STATIONS, ETC.—Con.								
301. Balboa Heights, Canal Zone	725	499	4	28	9,713	226	292	225
207. Bangor, Me.	23	3		1	59	20	29	50
348. Bath, Me.								
208. Bay City, Mich.	25					25	62	2
209. Beaufort, N. C.	123	18	1	2	282	105	501	13
349. Beaufort, S. C.								
210. Bellingham, Wash.	128	10	1		90	118	302	129
213. Boothbay Harbor, Me.	47	12	1	2	100	35	67	25
215. Bridgeport, Conn.	6	5			113	1	1	1
217. Brunswick, Ga.	81	13			159	68	110	58
219. Burlington, Iowa.	39	29	1	3	573	10	11	39
220. Cairo, Ill.	291	49		1	877	242	827	250
227. Calais, Me.								
221. Cambridge, Md.	40	24			276	16	33	12
224. Charleston, S. C.	537	93	2	1	1,123	444	965	200
350. Chattanooga, Tenn.								
226. Cincinnati, Ohio.	289	53	3	2	996	236	537	15
229. Cordova, Alaska.	112	29	1	2	483	83	85	11
230. Crisfield, Md.	225	37		2	393	188	510	25
234. Duluth, Minn.	506	50		2	623	456	615	359
236. Eastport, Me.	7					7	11	5
237. Edenton, N. C.	18					18	30	11
238. Elizabeth City, N. C.	75	1			12	74	268	37
351. Ellsworth, Me.								
352. El Paso, Tex.	215	13	1		265	202	1,725	419
239. Erie, Pa.	332	66	2		874	266	850	38
240. Escanaba, Mich.	41	19			613	22	22	3
241. Eureka, Calif.	201	54	1	1	803	147	389	25
244. Gallipolis, Ohio.	115	32	1		474	83	139	40
245. Galveston, Tex.	3,842	632	5	34	14,238	3,210	11,314	4,150
246. Georgetown, S. C.	73	9			122	64	114	59
247. Gloucester, Mass.	159	15	2		167	144	401	95
248. Grand Haven, Mich.	82	9			175	73	149	55
249. Green Bay, Wis.	54	10	1	1	79	44	93	87
250. Gulfport, Miss.	68	11			107	57	74	13
251. Hancock, Mich.	69	5		1	38	64	169	26
352. Hartford, Conn.	8	8			150			
254. Honolulu, Hawaii.	781	291	11	10	7,862	490	920	393
255. Hoquiam, Wash.	200	46	2	1	478	154	454	122
359. Houston, Tex.	63	12		1	309	51	90	4
258. Jacksonville, Fla.	646	197	2	7	2,474	449	1,093	275

260. Juneau, Alaska	169	65	3	2	1,192	104	110	29
262. Ketchikan, Alaska	224	54	1	2	621	170	387	6
264. La Crosse, Wis	29	6			216	23	74	97
265. Lowes, Del	183	11	1	1	93	172	593	35
346. Little Rock, Ark	68	7			206	61	155	127
266. Los Angeles, Calif	689	444	11	20	6,647	245	662	698
268. Ludington, Mich	108	18	1	1	246	90	365	9
269. Machias, Me	27					27	91	14
270. Manila, P. I	635	190		13	3,399	445	634	558
271. Manistee, Mich	59	13	1		205	46	152	17
272. Manitowoc, Wis	106	55	2	4	722	51	84	52
273. Marquette, Mich	185	21	1	1	540	164	689	43
274. Marshfield, Oreg	49	10			202	39	89	18
277. Menominee, Mich	85	2	1		84	83	242	143
347. Miami, Fla	29	9		1	252	20	27	8
278. Milwaukee, Wis	825	190	4	7	2,582	635	1,693	623
282. Nantucket, Mass	34					34	75	7
283. Nashville, Tenn	45					45	136	77
284. Natchez, Miss	103	8			109	95	220	34
285. New Bedford, Mass	361	15	1	1	410	346	650	248
286. New Bern, N. C	241	134	1	3	1,612	107	178	34
288. New Haven, Conn	28	8		1	253	20	36	78
289. New London, Conn	238	133	2	6	2,272	105	153	408
291. Newport, Ark	40					40	56	3
292. Newport, Oreg	40	1			3	39	100	8
293. Newport, R. I	199	50	2	2	651	149	195	100
295. Nome, Alaska	38	8			34	30	68	71
296. Norfolk, Va	743	32			391	711	1,553	324
297. Ogdensburg, N. Y	49	8			114	41	59	29
298. Oswego, N. Y	55	6	1		121	49	230	38
300. Paducah, Ky	273	37	2	2	572	236	785	419
302. Pensacola, Fla	367	103	4	5	2,453	264	594	122
303. Perth Amboy, N. J	57	11	1	1	167	46	73	17
304. Petersburg, Alaska	29					29	171	
305. Philadelphia, Pa	2,844	618	14	31	10,684	2,226	9,636	1,956
307. Ponce, P. R	27	10		3	249	17	29	5
308. Port Angeles, Wash	91	11			128	80	94	73
309. Port Arthur, Tex	711	141	2	11	1,692	570	1,614	101
310. Port Huron, Mich	180	28	1		207	152	546	133
312. Portland, Oreg	1,133	186	1	21	4,091	947	2,476	726
356. Portsmouth, N. H	5	2			9	3	3	3
314. Providence, R. I	405	134	3	5	2,798	271	572	384
315. Provincetown, Mass	33					53	261	18
353. Reedville, Va								
316. Richmond, Va	90	16			340	74	277	77
317. Rock Island, Ill	1,764	3	1		49	1,761	7,408	2,809
318. Rockland, Me	138	10		1	155	128	258	21
320. Saginaw, Mich	33	1			5	32	55	38
319. St. Thomas, Virgin Islands	42	4			48	38	38	30
354. Salem, Mass	1					1	1	1
323. San Diego, Calif	506	89	12	30	10,974	417	1,208	238
324. Sandusky, Ohio	47	9			132	38	69	27

TABLE II.—*Transactions at United States marine hospitals and other relief stations, fiscal year 1923*—Continued.

Location.	Total number of patients treated.	Total number treated in hospital.	Died.	Remaining in hospital June 30, 1923.	Number of days' relief in hospital.	Number of patients furnished office relief.	Number of times office relief was furnished.	Number of physical examinations.
SECOND, THIRD, AND FOURTH CLASS STATIONS, ETC.—Con.								
326. San Juan, P. R.	1,055	519	6	53	19,002	536	1,488	1,729
355. San Pedro, Calif.	1,986					1,986	2,356	139
327. Sault Ste. Marie, Mich.	298	182	5	5	1,829	116	323	68
329. Seattle, Wash.	1,956	167	9	16	5,786	1,789	4,583	2,173
331. Sheboygan, Wis.	44	3			125	41	121	20
328. Sitka, Alaska	10	1		1	6	9	10	
332. Solomons, Md.	122	5			48	117	165	135
334. South Bend, Wash.	93	18		1	142	75	264	10
361. Southport, N. C.	199					199	462	26
335. Superior, Wis.	199	45	1	2	754	154	291	5
345. Tacoma, Wash.	267	44	1	1	500	223	926	666
336. Tampa, Fla.	308	58	3	4	806	250	324	309
337. Toledo, Ohio	471	121	2	5	1,897	350	784	411
357. Unalaska, Alaska	45	10			299	35	57	
338. Vicksburg, Miss.	264	96		1	1,461	168	569	68
339. Washington, D. C.	2,012	159	4	4	2,849	1,853	14,829	2,758
360. Washington, D. C. (dental clinic)	310					310	3,163	
340. Washington, N. C.	44	7	1		127	37	73	12
342. Wilmington, N. C.	394	72	1	1	731	322	611	98
343. Wrangell, Alaska	54	2			59	52	300	103
MISCELLANEOUS.								
Black Mountain, N. C., Cragmont Sanatorium	7	7	1	6	2,388			
New London, Conn., United States Coast Guard Academy	853					853	2,377	203
United States Coast Guard contract physicians	1,498					1,498	6,497	397
United States Coast Guard vessels	2,461					2,461	8,661	626
United States Veterans' hospitals	159	155	8		7,152	4	9	
South Baltimore, Md., United States Coast Guard depot	3,567					3,567	7,796	102
Washington, D. C., St. Elizabeths Hospital	124	124	4	101	33,352			
Total	44,154	7,170	163	483	184,538	36,984	117,280	28,946
Grand total	136,660	39,109	821	2,905	1,189,869	97,551	310,016	77,438

TABLE III.—*Relief furnished at United States marine hospitals and other relief stations, fiscal year 1923, according to beneficiary.*

Beneficiary.	Class of station.	Total number of patients treated.[1]	Total number treated in hospital.	Died.	Remaining in hospital June 30, 1923.	Number of days' relief in hospital.	Number of patients furnished office relief.[1]	Number of times office relief was furnished.	Number of physical examinations.
American seamen	First-class stations	42,801	12,864	390	1,619	598,026	29,937	96,534	27,046
	Other relief stations	24,054	5,316	128	401	141,388	18,738	45,066	11,335
	Total	66,855	18,180	518	2,020	739,414	48,675	141,600	38,381
Foreign seamen	First-class stations	662	580	12	24	15,011	82	171	786
	Other relief stations	154	98	5	3	1,661	56	79	410
	Total	816	678	17	27	16,672	138	250	1,196
United States Coast Guard	First-class stations	2,882	1,191	12	86	35,686	1,691	4,753	1,633
	Other relief stations	9,188	393	5	9	5,995	8,795	27,777	2,574
	Total	12,070	1,584	17	95	41,681	10,486	32,530	4,207
United States Army	First-class stations	413	34	2	3	546	379	652	140
	Other relief stations	58	11			69	47	89	126
	Total	471	45	2	3	615	426	741	266
United States Navy	First-class stations	106	56	3	1	1,232	50	261	85
	Other relief stations	50	23	1		284	27	58	13
	Total	156	79	4	1	1,516	77	319	98
Mississippi River Commission	First-class stations	611	234	6	10	5,849	377	917	389
	Other relief stations	349	59	2	1	876	290	835	410
	Total	960	293	8	11	6,725	667	1,752	799
Seamen, United States Engineer corps and Army Transport Service.	First-class stations	565	197	7	20	8,867	368	1,185	141
	Other relief stations	841	153	1	5	2,121	688	1,991	316
	Total	1,406	350	8	25	10,988	1,056	3,176	457
United States Lighthouse Service	First-class stations	629	215	7	24	7,229	414	1,330	174
	Other relief stations	642	80	2	3	1,561	562	1,229	250
	Total	1,271	295	9	27	8,790	976	2,559	420
United States Coast and Geodetic Survey.	First-class stations	148	75		2	2,277	73	176	192
	Other relief stations	475	53	2	4	1,087	422	1,007	625
	Total	623	128	2	6	3,364	495	1,183	871

[1] See note 2, Table I.

TABLE III.—*Relief furnished at United States marine hospitals and other relief stations, fiscal year 1923, according to beneficiary*—Continued.

Beneficiary.	Class of station.	Total number of patients treated.	Total number treated in hospital.	Died.	Remaining in hospital June 30, 1923.	Number of days' relief in hospital.	Number of patients furnished office relief.[1]	Number of times office relief was furnished.	Number of physical examinations.
United States Employees' Compensation Commission.	First-class stations	21,410	995	17	91	31,990	20,415	57,621	7,010
	Other relief stations	6,759	452	6	16	10,552	6,307	33,523	5,278
	Total	28,169	1,447	23	107	42,542	26,722	91,144	12,288
United States Veterans' Bureau	First-class stations	9,050	3,438	69	182	106,915	5,612	24,679	4,019
	Other relief stations	537	427	8	36	17,178	110	422	1,036
	Total	9,587	3,865	77	218	124,093	5,722	25,101	5,055
Discharged allied soldiers	First-class stations	115	44	1	4	2,225	71	273	57
	Other relief stations	2	2	1		14			53
	Total	117	46	2	4	2,239	71	273	110
United States Immigration Service	First-class stations	11,432	11,378	113	170	120,980	54	64	152
	Other relief stations	237	87	1	5	1,500	150	1,041	764
	Total	11,669	11,465	114	175	122,480	204	1,105	916
United States Public Health Service officers and employees.	First-class stations	1,387	436	8	13	5,615	951	3,977	510
	Other relief stations	375	15	1		192	360	3,278	100
	Total	1,762	451	9	13	5,807	1,311	7,255	610
Lepers	First-class stations	192	192	10	172	62,736			
	Other relief stations								
	Total	192	192	10	172	62,736			
Miscellaneous	First-class stations	103	10	1	1	147	93	143	6,158
	Other relief stations	433	1			60	432	885	5,656
	Total	536	11	1	1	207	525	1,028	11,814
Grand total	First-class stations	92,506	31,939	658	2,422	1,005,331	60,567	192,736	48,492
	Other relief stations	44,154	7,170	163	483	184,538	36,984	117,280	28,946
	Total	136,660	39,109	821	2,905	1,189,869	97,551	310,016	77,438

TABLE IV.—*Causes of admission for discharged patients, and condition on discharge, United States marine hospitals and other relief stations, fiscal year 1923.*

Disease or condition.	Number having specified disease or injury.					Condition on discharge of patients admitted for specified disease or injury.				
	Major condition for which admitted.[1]	Condition second in importance.	Condition third in importance.[2]	Sequelæ to major condition.	Total number of persons having each specified disease or injury.	Cured.	Improved.	Not improved.	Died.	Other conditions.
Abnormalities and congenital malformations	28					10	10	1		7
Blood and blood-forming organs, diseases and injuries of	22					4	6		4	8
Bones and cartilages, diseases and injuries of	1,293					306	521	19	20	427
Circulatory system, diseases and injuries of:										
Heart disease, valvular	243	150	44	4	441		134	6	45	58
Varicose veins	114	54	29		197	42	45		1	26
All others	438					72	202	10	66	88
Communicable and infectious diseases, not including tuberculosis and venereal:										
Conjunctivitis, granular trachomatous	90	7	1		98	7	51	12		20
Dengue	128	11	2		141	89	24			15
Influenza	592	28	4	2	626	349	166		9	68
Malaria	495	58	11	4	568	208	224		2	61
Rheumatic fever, acute	107	14	1	1	123	46	43			18
Typhoid fever	106	7	3		116	64	21		16	5
All others	273					173	51		17	32
Dental	146					41	78		1	26
Digestive system, diseases and injuries of:										
Appendicitis	445	77	8	1	531	237	145	1	17	45
Gastritis	230	35	7	1	273	97	109	3	3	18
Hemorrhoids	291	100	22	1	414	153	92	1	1	44
All others	758					246	357	6	21	128
Ear, nose, and throat, diseases and injuries of:										
Deviation, nasal septum	130	81	24	1	236	49	46	4		31
Otitis media	132	78	25	2	237	29	67	6		30
Tonsilitis	1,201	368	115	6	1,690	576	421	6	3	195
All others	407					157	159	9	3	79
Endocrines, diseases and injuries of	121					7	51	3	23	37
Eye, and annexa, diseases and injuries of	275					60	131	13	1	70

[1] Represents number of discharges for each condition.
[2] Where sequelae were given no third diagnosis was recorded.

NOTE.—This table does not include immigration patients discharged from United States Marine Hospital No. 43, Ellis Island, N. Y.

TABLE IV.—*Causes of admission for discharged patients, and condition on discharge, United States marine hospitals and other relief stations, fiscal year 1923*—Continued.

Disease or condition.	Number having specified disease or injury.					Condition on discharge of patients admitted for specified disease or injury.				
	Major condition for which admitted.[1]	Condition second in importance.	Condition third in importance.[2]	Sequelæ to major condition.	Total number of persons having each specified disease or injury.	Cured.	Improved.	Not improved.	Died.	Other conditions.
Genito-urinary system, diseases and injuries of (exclusive of venereal):										
Nephritis	178	97	48	8	331	5	95	3	33	42
All others	630					179	310	3	8	130
Hernia	971					566	213	12	6	174
Joints and Bursæ, diseases and injuries of:										
Arthritis	464	146	33	12	655	63	277	11	4	109
All others	328					63	156	9	4	96
Lymphatic system, diseases and injuries of:										
Lymphadenitis	295	148	9	44	496	82	156		1	56
All others	35					11	13			11
Muscles, fascia, tendons, and tendon sheaths, diseases and injuries of	593					228	261	3		101
Nervous system, diseases and injuries of:										
Epilepsy without psychosis	82	15	2	1	100		33	11		38
Neuritis	199	31	13	5	248	29	109	3	4	54
All others	406					41	169	20	19	157
Obstetric and gynecological conditions	11					5	5			1
Parasitic diseases:										
Uncinariasis	93	61	24		178	14	32			47
All others	88					25	45	1		17
Poisonings and intoxications:										
Alcohol (ethyl) poisoning, acute	106	20	1		127	47	36			23
Alcoholism, chronic (without psychosis)	32	7	3		42	7	16		1	8
All others	85					53	22		1	9
Psychiatric diseases:										
Drug addiction without psychosis	16	7	3		26	2	8	1		5
All others	251					25	64	15	8	139
Respiratory system, diseases and injuries of (exclusive of tuberculosis):										
Asthma	153	49	11	1	214	8	83	5	4	53
Bronchitis	733	214	43	3	993	282	334	9	8	100
Pleurisy	181	99	26	8	314	44	96	3	6	32
Pneumonia	234	54	20	22	330	109	53		51	21

All others	21					2	11	1		7
Skin and its appendages, diseases and injuries of	580					171	287	4	4	114
Tuberculosis:										
Tuberculosis, pulmonary	1,220	171	46		1,437	3	202	27	179	809
Other forms	94	59	7	8	168	9	37	2	10	36
Tumors:										
Carcinoma	100	15	7	5	127	5	23	2	45	25
All others	143					50	52	1	2	38
Venereal diseases:										
Chancroidal infections	500	194	29	4	727	167	246	1		86
Gonococcus infections	2,025	606	70	18	2,719	453	1,180	2	3	387
Syphilis	1,444	655	187	4	2,290	81	955	11	23	374
All others	22					9	8			5
Inoculations	3					2				1
Under observations	552									552
Miscellaneous:										
Cellulitis	195	26	4	17	242	91	64		1	39
All others	3,093					989	1,328	27	45	704
Total	24,221					6,942	10,133	287	723	6,136

TABLE V.—*Causes of death in United States marine hospitals and other relief stations during fiscal year 1923.*[1]

International list No.	Cause of death.	Number of deaths.
	I. EPIDEMIC, ENDEMIC AND INFECTIOUS DISEASES.	
1	Typhoid and paratyphoid fever	16
5	Malaria	3
10	Diphtheria	1
11	Influenza	3
17	Plague	1
20	Leprosy	1
21	Erysipelas	1
23	Lethargic encephalitis	2
24	Meningococcus meningitis	1
26	Glanders	1
29	Tetanus	1
31	Tuberculosis of the respiratory system	189
32	Tuberculosis of the meninges and central nervous system	3
33	Tuberculosis of the intestines and peritoneum	4
34	Tuberculosis of the vertebral column	2
36	Tuberculosis of other organs	5
38	Syphilis	9
41	Purulent infection, septicemia	9
42	Other infectious diseases	1
	II. GENERAL DISEASES NOT INCLUDED ABOVE.	
43	Cancer and other malignant tumors of the buccal cavity	2
44	Cancer and other malignant tumors of the stomach and liver	22
45	Cancer and other malignant tumors of the peritoneum, intestines and rectum	4
46	Cancer and other malignant tumors of the female genital organs	1
49	Cancer and other malignant tumors of other or unspecified organs	20
50	Benign tumors and tumors not returned as malignant	1
52	Chronic rheumatism, osteoarthritis, gout	1
54	Pellagra	1
57	Diabetes mellitus	23
58	Anemia, chlorosis	3
65	Leukemia and Hodgkin's disease	1
67	Chronic poisoning by mineral substances	1
	III. DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.	
70	Encephalitis	1
71	Meningitis	5
72	Tabes dorsalis	1
74	Cerebral hemorrhage, apoplexy	27
75	Paralysis without specified cause	4
76	General paralysis of the insane	4
77	Other forms of mental alienation	2
82	Neuralgia and neuritis	2
84	Other diseases of the nervous system	1
	IV. DISEASES OF THE CIRCULATORY SYSTEM.	
87	Pericarditis	3
88	Endocarditis and myocarditis (acute)	7
89	Angina pectoris	2
90	Other diseases of the heart	79
91	Diseases of the arteries	9
92	Embolism and thrombosis	4
93	Diseases of the veins (varices, hemorrhoids, phlebitis, etc.)	2
95	Hemorrhage without specified cause	1
96	Other diseases of the circulatory system	2
	V. DISEASES OF THE RESPIRATORY SYSTEM.	
99	Bronchitis	1
100	Bronchopneumonia (including capillary bronchitis)	20
101	Pneumonia	64
102	Pleurisy	5
103	Congestion and hemorrhagic infarct of the lung	1
104	Gangrene of the lung	1
107	Other diseases of the respiratory system	9
	VI. DISEASES OF THE DIGESTIVE SYSTEM.	
111	Ulcer of the stomach and duodenum	3
112	Other diseases of the stomach	4
117	Appendicitis and typhlitis	6
118	Hernia, intestinal obstruction	6
119	Other diseases of the intestines	2
122	Cirrhosis of the liver	4
124	Other diseases of the liver	2
125	Diseases of the pancreas	1
126	Peritonitis without specified cause	11
127	Other diseases of the digestive system	6

[1] Classified according to International List of Causes of Death.

TABLE V.—*Causes of death in United States marine hospitals and other relief stations during fiscal year 1923*—Continued.

International list No.	Cause of death.	Number of deaths.
	VII. NONVENEREAL DISEASES OF THE GENITO-URINARY SYSTEM AND ANNEXA.	
128	Acute nephritis	8
129	Chronic nephritis	22
131	Other diseases of the kidneys and annexa	13
133	Diseases of the bladder	1
134	Diseases of the urethra, urinary abscess, etc	1
138	Salpingitis and pelvic abscess	1
	IX. DISEASES OF THE SKIN AND OF THE CELLULAR TISSUE.	
151	Gangrene	1
	X. DISEASES OF THE BONES AND OF THE ORGANS OF LOCOMOTION.	
155	Diseases of the bones	2
157	Amputations	1
	XIII. OLD AGE.	
164	Senility	1
	XIV. EXTERNAL CAUSES.	
170	Suicide by firearms	2
171	Suicide by cutting or piercing instruments	2
174	Other suicides	2
175	Poisoning by food	1
177	Other acute accidental poisonings	1
179	Accidental burns	7
182	Accidental drowning	1
185	Accidental traumatism by fall	3
188	Accidental traumatism by other crushing (vehicles, railways, landslides, etc)	3
201	Fracture (cause not specified)	6
202	Other external violence	2
	XV. ILL-DEFINED DISEASES.	
204	Sudden death	3
205	Cause of death not specified or ill-defined	4
	Total	723

NOTE.—This table does not include deaths of immigration patients in United States Marine Hospital No. 43, Ellis Island, N. Y.

TABLE VI.—*Number of patients of each class of beneficiary discharged from United States Marine Hospitals and other relief stations during the fiscal year 1923, by broad groups of conditions.*

Group.	Class of beneficiary.																
	Total.	American seamen.	U. S. Army.	U. S. Coast and Geodetic Survey.	U. S. Coast Guard.	Discharged allied soldiers.	Employees' Compensation Commission.	Seamen, Engineer Corps and Army Transport Service.	Foreign seamen.	Immigrants and alien seamen.	U. S. Lighthouse Service.	Mississippi River Commission.	U. S. Navy and Marine Corps.	U. S. Public Health Service officers and employees.	U. S. Veterans' Bureau.	Lepers.	Miscellaneous.
Abnormalities and congenital malformations	28	19			1		1								7		
Blood and blood-forming organs, diseases and injuries of	22	15			2			1				1			2		1
Bones and cartilages, diseases and injuries of	1,293	837		4	37	4	247	16	16		13	11	6	10	92		
Circulatory system, diseases and injuries of	795	512	1	2	33	2	20	17	7		4	7	2	8	180		
Communicable and infectious diseases, not including tuberculosis and venereal	1,791	1,122	6	17	188		24	59	84	2	19	78	7	82	88	15	
Dental	146	78		1	27		1		4		1	1		1	32		
Digestive system, diseases and injuries of	1,724	1,120	6	16	142	1	15	30	36		27	14	13	53	250		1
Ear, nose, and throat, diseases and injuries of	1,870	922	3	18	174	2	8	14	16		26	14	12	111	550		
Endocrines, diseases and injuries of	121	60			6		2		2		3	2		3	43		
Eye and annexa, diseases and injuries of	275	152	1		22		19	8	7		3	2	2	3	56		
Genito-urinary system, diseases and injuries of (exclusive of venereal)	808	561	1	4	56	5	15	8	13	1	13	11	3	17	99		1
Hernia	971	629		5	19	3	191	8	5		11	1	1	7	90		1
Joints and bursæ, diseases and injuries of	792	510	1	2	45	1	56	7	12		2	4	2	7	143		
Lymphatic system, diseases and injuries of	330	260		2	17		7	2	16	1	2	2		5	16		
Muscles, fasciæ, tendons, and tendon sheaths, diseases and injuries of	593	393	1	4	61		74	14	6		9	6		9	16		
Nervous system, diseases and injuries of	687	373			45	1	33	12	4		10	7	1	9	192		

Obstetric and gynecological conditions	11	7					1			1				2			
Parasitic diseases	181	59	3		4			1	4					1	109		
Poisonings and intoxications	223	183	1		7		10	3	4		3	3	1	2	6		
Psychiatric diseases	267	122	1		19		14	2			2			3	104		
Respiratory system, diseases and injuries of (exclusive of tuberculosis)	1,322	890	1	4	81	1	14	24	32	1	24	24	9	36	184		
Skin and its appendages, diseases and injuries of	580	389	2	3	68	2	18	6	16		3	8		7	58		
Tuberculosis	1,314	700			25	6	27	14	27	5	1	4	1	12	492		
Tumors	243	163	1		10		5	5	1		14	2		1	41		
Venereal diseases	3,991	3,135	3	25	171		26	37	319	56	29	22	6	8	154		
Inoculations	3				2				1								
Under observation	552	216		3	36		22	1	19	4	9	8		11	223		
Miscellaneous	3,288	2,226	8	10	126	6	326	42	67		45	38	8	38	345	1	2
Total cases	24,221	15,653	40	120	1,424	34	1,173	331	718	71	273	270	74	446	3,572	16	6

NOTE.—This table does not include immigration patients discharged from United States Marine Hospital No. 43, Ellis Island, N. Y.

TABLE VII.—*Number of days in hospital for patients discharged during fiscal year 1923 from United States Marine hospitals and other relief stations, by broad groups of conditions and class of beneficiary.*

Group.	Class of beneficiary.																
	Total.	American seamen.	U. S. Army.	U. S. Coast and Geodetic Survey.	U. S. Coast Guard.	Discharged allied soldiers.	Employees' Compensation Commission.	Seamen, Engineer and Army Transport Service.	Foreign seamen.	Immigrants and alien seamen.	U. S. Lighthouse Service.	Mississippi River Commission.	U. S. Navy and Marine Corps.	U. S. Public Health Service officers and employees.	U. S. Veterans' Bureau.	Lepers.	Miscellaneous.
Abnormalities and congenital malformations	959	756			28		3								172		
Blood and blood-forming organs, diseases and injuries of	1,003	843			42			41				17			59		1
Bones and cartilages, diseases and injuries of	66,473	45,258		188	1,814	771	10,522	472	493		810	364	107	329	5,345		
Circulatory system, diseases and injuries of	48,225	35,327	1	53	2,438	358	379	1,491	89		102	519	115	311	7,042		
Communicable and infectious diseases, not including tuberculosis and venereal	51,828	23,321	27	329	2,115		478	863	1,448	11	426	1,269	41	5,770	4,998	10,732	
Dental	2,827	1,355		36	661		18		33		96	14		2	612		
Digestive system, diseases and injuries of	45,408	28,734	49	319	3,490	49	288	984	781		426	193	195	591	9,304		5
Ear, nose, and throat, diseases and injuries of	28,718	14,188	15	212	2,886	18	71	587	182		308	146	168	680	9,257		
Endocrines, diseases and injuries of	6,514	3,530			97		181		106		23	123		234	2,220		
Eye and annexa, diseases and injuries of	8,081	4,614	4		618		422	528	80		14	33	38	16	1,714		
Genito-urinary system, diseases and injuries of (exclusive of venereal)	27,320	18,038	15	38	1,645	260	163	248	397	80	398	241	119	344	5,272		62
Hernia	30,469	20,664		105	560	78	4,941	263	136		399	16	1	372	2,908		26
Joints and bursæ, diseases and injuries of	43,208	28,554	3	169	2,208	56	1,782	408	574		124	393	21	104	8,812		
Lymphatic system, diseases and injuries of	11,797	9,466		53	522		150	39	604	11	9	13		111	819		
Muscles, fasciæ, tendons, and tendon sheaths, diseases and injuries of	13,638	8,956	7	98	1,550		1,609	402	280		141	51		70	474		
Nervous system, diseases and injuries of	56,897	42,303			3,176	43	2,142	439	52		302	144	163	87	8,046		

Obstetric and gynecological conditions	285	151					118			3				13				
Parasitic diseases	4,379	1,853	21		136			48	57					13	2,251			
Poisonings and intoxications	2,562	2,037	3		45		148	11	96		23	17	1	50	131			
Psychiatric diseases	21,166	13,390	28		1,142		1,626	34			13			8	4,925			
Respiratory system, diseases and injuries of (exclusive of tuberculosis)	39,308	26,003	4	44	2,444	101	333	356	596	13	880	1,075	97	298	7,064			
Skin and its appendages, diseases and injuries of	16,864	12,431	31	74	1,160	84	335	96	109		39	122		142	2,241			
Tuberculosis	177,829	140,030			3,765	535	5,084	1,068	2,343	106	221	1,253	123	911	22,390			
Tumors	9,119	7,347	8		108		35	51	15		318	16		8	1,213			
Venereal diseases	151,804	123,116	130	1,118	5,007		562	1,336	9,760	1,086	860	476	193	83	8,077		1	
Inoculations	21				8				13									
Under observation	7,465	3,622		15	418		161	60	82	38	88	48		113	2,820			
Miscellaneous	94,161	64,495	167	183	3,007	372	9,104	761	1,580		531	595	98	359	12,784	110	15	
Total days	968,328	680,382	513	3,034	41,090	2,725	40,655	10,586	19,906	1,348	6,551	7,138	1,480	11,019	130,950	10,842	110	

NOTE.—This table does not include immigration patients discharged from United States Marine Hospital No. 43, Ellis Island, N. Y.

DIVISION OF VENEREAL DISEASES.

In charge of Asst. Surg. Gen. Mark J. White.

Reports from health departments and physicians throughout the country indicate that the occurrence of new cases of venereal disease is noticeably less. It is suggested that an apparent increase in certain localities is probably caused by persons with old infections seeking medical treatment as a result of the educational work carried on by the State departments of health and the United States Public Health Service, in which infected persons have been urged to continue their treatment until a cure is accomplished. The indication, therefore, is that the work should be maintained and developed along the lines which have been found effective. This is the view held by other countries that have been enforcing methods similar to those in use in this country. It is believed that, as a result of the educational activities, physicians detect more readily obscure evidence of chronic venereal disease. Emphasizing the importance of prompt detection and prompt adequate treatment of venereal disease in all stages is now an established part of the program for the relief and prevention of venereal diseases. Not only is this aspect more fully appreciated by the physician to-day, but the populace, through active educational work, more thoroughly understands the necessity for early adequate treatment and the dangers of neglected or inadequate treatment. A review of activities in venereal disease control during the past year shows the following three favorable indications of developments in the joint Federal and State program:

1. Decrease in the number of new infections. Last year various opinions were given regarding a possible decrease in the venereal-disease rate. With the object of securing the views of persons whose judgment could be relied upon, questionnaires were sent to State and county medical societies, members of the American Urological Society and the American Dermatological Association, and others. The consensus of opinion expressed was that there seemed to be a decrease in the number of new or acute gonococcus and syphilitic infections. A possible decrease in incidence is also suggested by the decrease in the number of new patients admitted to clinics.

The opinion that the rate of new venereal infections is decreasing is further substantiated by statistics prepared by the office of the Surgeon General of the Army showing the incidence of venereal diseases among enlisted men and officers. The rate of infection per 1,000 men for the last six years is as follows:

1917	107.23	1920	78.99
1918	90.47	1921	66.77
1919	61.31	1922	64.63

As statistics of diseases in the Army are computed by the calendar year rather than by the fiscal year, the rate of venereal infection for

the year 1923 is not available at this time. It can be seen, however, from the statistics quoted above that there has been a marked decline in the rate of venereal infection since 1920.

2. A tendency of patients to continue treatment for a longer period and also an increase of patients who continue treatment until cured. Results of the year's work show that the volume of medical service in the clinics has been maintained despite the fact that fewer new patients have been admitted. This is shown by comparing the total number of treatments per clinic and the doses of arsphenamin given with the number of patients admitted and the totals reported in 1922. This may be interpreted as a response by patients to the educational campaign conducted by the Federal Government and the State boards of health to show the necessity of sustained adequate treatment even after the more obvious evidences of infection have disappeared.

3. Better cooperation on the part of physicians in the reporting of venereal disease cases to the State boards of health. An outstanding feature of the progress made during the past year is the larger number of cases of venereal disease reported to State boards of health. Considered with the decrease in the number of patients admitted to clinics, this would seem to indicate better cooperation on the part of physicians in notifying the health authorities of their cases.

As in previous years, activities in the control of venereal diseases were conducted along the lines of medical, educational, and legal measures during the fiscal year 1923.

Federal and State Appropriations.

For the fiscal year 1923, Congress made an appropriation of $400,000 to the division of venereal diseases, of which sum $225,000 was allotted to State boards of health for cooperative work in the prevention and control of venereal diseases. Forty-six States received their allotments by complying with the regulations promulgated by the Secretary of the Treasury. Owing to lack of adequate legislation, the District of Columbia, Illinois, and Utah failed to qualify for their portion of this appropriation. The States, through legislative action or from other sources, had more than $800,000 in addition to the Federal allotment for use in controlling venereal diseases in 1923. The following table gives the amount of the State appropriation and Federal allotment:

Federal allotments and State appropriations for venereal-disease prevention work for the fiscal year 1923.

State.	State appropriation.	Federal allotment.	Total amount available.
United States	$826,597.92	$209,309.15	$1,035,907.07
Alabama	25,000.00	4,997.98	29,997.98
Arizona	711.25	711.25	1,422.50
Arkansas	12,500.00	3,729.48	16,229.48
California	25,800.00	7,293.91	33,093.91
Colorado	20,000.00	1,999.96	21,999.96
Connecticut	10,000.00	2,938.61	12,938.61
Delaware	2,500.00	474.65	2,974.65
District of Columbia			
Florida	2,061.34	2,061.34	4,122.68

Federal allotments and State appropriations for venereal-disease prevention work for the fiscal year 1923—Continued.

State.	State appropriation.	Federal allotment.	Total amount available.
Georgia	12,872.56	6,163.64	19,036.20
Idaho	919.21	919.21	1,838.42
Illinois	100,000.00		
Indiana	52,600.00	6,237.19	58,837.19
Iowa	25,000.00	5,116.84	30,116.84
Kansas	7,500.00	3,765.78	11,265.78
Kentucky	20,000.00	5,143.68	25,143.68
Louisiana	12,500.00	3,828.04	16,328.04
Maine	10,000.00	1,634.68	11,634.68
Maryland	28,220.00	3,085.53	31,305.53
Massachusetts	69,529.10	8,199.55	77,728.65
Michigan	52,800.00	7,808.05	60,608.05
Minnesota	30,000.00	5,080.88	35,080.88
Mississippi	16,000.00	3,811.24	19,811.24
Missouri	16,304.31	7,245.37	23,549.68
Montana	4,645.00	1,168.28	5,813.28
Nebraska	14,140.00	2,759.26	16,899.26
Nevada	164.75	164.75	329.50
New Hampshire	6,000.00	943.08	6,943.08
New Jersey	20,000.00	6,717.81	26,717.81
New York	40,380.00	22,104.46	62,484.46
New Mexico	1,944.00	766.99	2,710.99
North Carolina	5,446.97	5,446.97	10,893.94
North Dakota	6,274.24	1,376.84	7,651.08
Ohio	25,000.00	12,258.59	37,258.59
Oklahoma	15,000.00	4,317.10	19,317.10
Oregon	6,000.00	1,667.41	7,667.41
Pennsylvania	18,560.14	18,560.14	37,120.28
Rhode Island	7,500.00	1,286.43	8,786.43
South Carolina	3,583.73	3,583.73	7,167.46
South Dakota	5,000.00	1,354.86	6,354.86
Tennessee	12,978.36	4,976.08	17,954.44
Texas	9,925.46	9,925.46	19,850.92
Utah			
Vermont	4,000.00	750.13	4,750.13
Virginia	10,000.00	4,914.99	14,914.99
Washington	2,887.50	2,887.50	5,775.00
West Virginia	10,000.00	3,115.42	13,115.42
Wisconsin	41,350.00	5,602.23	46,952.23
Wyoming	3,000.00	413.78	3,413.78

For the fiscal year 1924, an appropriation of $227,353 was made by Congress for the division of venereal diseases. Of this sum, $100,000 is to be allotted to State boards of health that comply with the regulations of the Secretary of the Treasury. In addition to the Federal fund, more than $657,000 has been set aside by the States for venereal-disease control purposes. The proportion of Federal to State funds has decreased from 27.8 per cent in 1923 to 15.2 per cent in 1924. This withdrawal of Federal assistance throws the States more completely upon their own resources. The following table gives the Federal allotments and State appropriations for the control of venereal diseases for the fiscal year 1924:

Federal allotments and State appropriations for the control of venereal diseases for the fiscal year 1924.

State.	Federal allotments.	State appropriations.	State.	Federal allotments.	State appropriations.
United States	$100,000.00	$657,276.44	Montana	$519.24	$2,500.00
			Nebraska	1,226.34	6,280.00
Alabama	2,221.32		Nevada	73.22	329.50
Arizona	316.12	316.12	New Hampshire	419.15	6,000.00
Arkansas	1,657.55	12,500.00	New Jersey	2,985.41	25,000.00
California	3,241.74	7,293.91	New Mexico	340.88	1,944.00
Colorado	888.87	[1] 32,000.00	New York	9,824.20	[3] 47,000.00
Connecticut	1,306.05	10,000.00	North Carolina	2,420.88	5,446.97
Delaware	210.96	2,000.00	North Dakota	611.93	6,274.24
District of Columbia	413.93		Ohio	5,448.26	25,000.00
Florida	916.16	916.16	Oklahoma	1,918.71	25,000.00
Georgia	2,739.40	10,000.00	Oregon	741.07	5,000.00
Idaho	408.54		Pennsylvania	8,248.95	38,000.00
Illinois	6,134.94		Rhode Island	571.75	7,500.00
Indiana	2,772.08	[2] 37,000.00	South Carolina	1,592.77	[2] 8,407.23
Iowa	2,274.15	25,000.00	South Dakota	602.16	
Kansas	1,673.68	3,000.00	Tennessee	2,211.59	15,571.30
Kentucky	2,286.08	20,000.00	Texas	4,411.32	
Louisiana	1,701.35	12,500.00	Utah	425.12	
Maine	726.52	10,000.00	Vermont	333.39	4,000.00
Maryland	1,371.35	25,920.00	Virginia	2,184.44	7,433.68
Massachusetts	3,644.24	70,940.00	Washington	1,283.33	1,283.33
Michigan	3,470.24	38,700.00	West Virginia	1,384.63	21,000.00
Minnesota	2,258.17	25,000.00	Wisconsin	2,489.88	36,370.00
Mississippi	1,693.88	16,000.00	Wyoming	183.90	
Missouri	3,220.16	2,850.00			

[1] Includes $12,000 for detention home.
[2] Approximately.
[3] Exclusive of New York City.

The division of venereal diseases had $175,000 with which to carry on its work in 1923. In 1924, $127,353 will be available.

Medical Measures.

The decrease in medical activities which followed the cessation of the Federal allotments, reported by State boards of health in 1922, seems to have been checked. More cases of venereal diseases were reported to State boards of health in 1923 than in 1922 despite the fact that relatively fewer cases were reported by clinics. As has been stated, this would seem to indicate better notification of cases by physicans in private practice.

CLINICS.

New clinics established.—During the fiscal year 1923, 33 new clinics were established and 43 clinics were discontinued.[1]

Clinic reports.—Reports from 513 clinics have been tabulated. The number of monthly reports per clinic received in 1923 is 10.4 as compared with 9.9 in 1922, indicating a tendency on the part of the clinics to report with greater regularity.

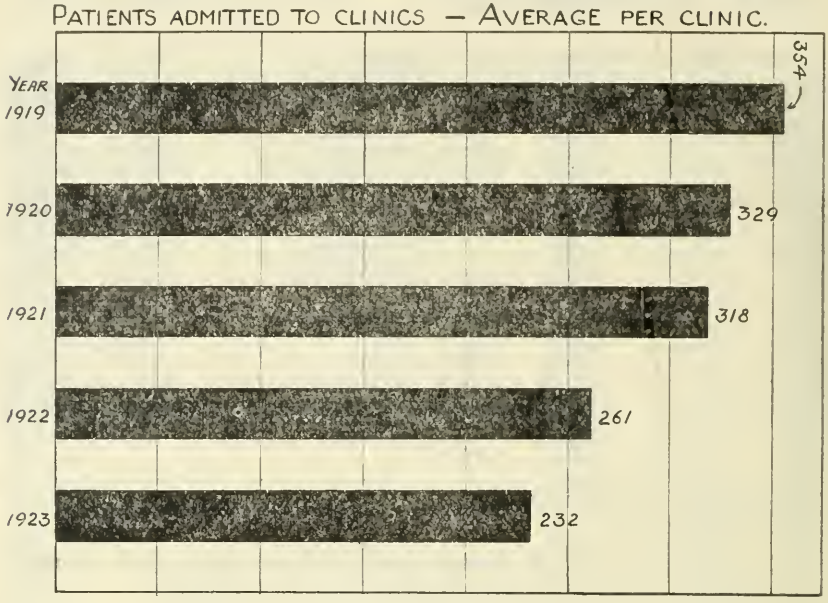
New patients admitted to clinics numbered 119,217 in 1923, or 232 per clinic. This is a decrease of 11 per cent from the average number of admissions per clinic in 1922. This decline in clinic attendance, as mentioned above, may be due to a decrease in the rate of venereal infection. The accompanying diagram indicates the average of new admissions per clinic by years.

Among the new patients at the clinics there were 63,812 cases of syphilis, 49,340 cases of gonorrhea, and 4,245 cases of chancroid.

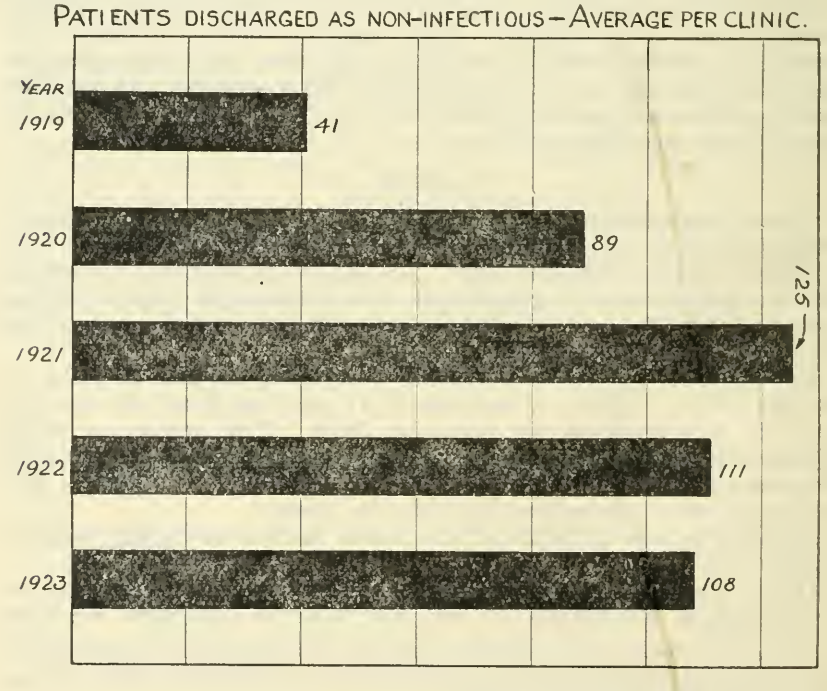
Of the patients treated at the clinics, 55,503 were discharged as noninfectious, an average of 108 per clinic as compared with an

[1] The discrepancy between the 541 clinics listed in 1922 and the 513 listed in 1923 is due to the fact that a few correctional and penal institutions were included through error in the tabulation of clinic activities in 1922. They have been omitted from the list of clinics tabulated on page 247 and are included among the institutions for which a report is made on page 255.

average of 111 in 1922. The tendency of the clinics to bring more patients to a noninfectious stage is shown by comparing the number of discharges with the number of those admitted for treatment.



The following diagram gives the average number of patients discharged as noninfectious by years:



Doses of arsphenamin administered in the clinics in 1923 have increased to 497,658, or 970 per clinic, as compared with an average of 941 in 1922. Treatments for all venereal cases totaled 1,992,631. The average per clinic, 3,884, is slightly in excess of that for 1922, which was 3,780 per clinic. These facts tend to indicate that the volume of work in the clinics has been maintained.

Wassermann tests made totaled 274,957, and microscopic examinations for gonococcus infection 191,132.

On the whole, the work of the clinics seems to be holding its own in spite of the decrease in appropriations. Any falling off in the number of new patients is offset by a relatively larger number of patients discharged as noninfectious, more treatments and more doses of arsphenamin per clinic and per patient admitted, and more Wassermann tests and examinations for gonococcus infection per syphilis and per gonorrhea patient admitted.

Following is the complete tabulated report of the clinics:

Reports of clinics, including those operating under the joint control of the United States Public Health Service and State boards of health, July 1, 1922–June 30, 1923.

State and city.	Total monthly reports received.	Patients admitted.				Patients discharged as noninfectious.	Treatments given.	Doses of arsphenamin administered.	Wassermann tests made.	Microscopic examinations, gonococcus.
		Total.	Syphilis.	Gonorrhea.	Chancroid.					
United States.	5,344	[1]119,217	63,812	49,340	4,245	55,503	1,992,631	497,658	274,957	191,132
Alabama	157	7,821	5,120	2,564	137	4,509	84,671	33,215	10,934	3,034
Albany	12	65	46	19		26	935	385	190	32
Bessemer	12	189	165	24		153	2,276	977	475	57
Birmingham(2)	15	2,439	1,790	644	5	1,143	24,706	10,375	5,900	940
Eufaula	12	186	80	91	15	223	2,427	601		533
Gadsden	12	128	68	56	4	101	2,294	589	128	51
Huntsville	12	283	94	184	5	211	3,268	845	887	234
Mobile	12	912	636	270	6	132	11,853	6,453	545	101
Montgomery	12	299	240	57	2	99	4,122	1,112	189	
Riderwood	12	86	45	41		64	763	327	52	4
Selma	12	199	176	16	7	67	1,874	885	428	5
Talladega	10	178	60	109	9	243	2,209	394	77	57
Tuscaloosa	12	273	198	75		85	7,974	1,515	443	269
Cooperative	12	2,584	1,522	978	84	1,962	19,880	8,757	1,620	751
Arkansas	95	2,853	1,836	938	79	1,739	67,077	12,112	6,057	3,571
Fort Smith	12	70	39	30	1	9	382	281	55	8
Hot Springs (2)	23	1,793	1,247	495	51	1,325	43,228	9,212	4,555	1,959
Little Rock	12	414	284	128	2	44	7,326	1,163	909	444
North Little Rock	12	49	47	2		29	518	454	198	29
Pine Bluff	12	18	16	2		9	306	180	20	6
Texarkana	12	337	105	212	20	247	13,662	392	188	1,029
West Helena	12	172	98	69	5	76	1,625	430	132	96
California	59	3,388	1,908	1,391	89	549	45,758	14,875	10,415	3,571
Fresno	6	185	127	48	10	108	3,963	642	1,338	347
Los Angeles (3)	20	2,242	1,312	922	8	225	20,463	6,649	3,510	1,232
Oakland	5	195	85	110		7	3,878	1,003	1,126	138
San Diego	4	135	38	35	62	20	1,142	145	217	136
San Francisco (3)	16	602	323	270	9	183	15,669	6,189	3,976	1,709
San Jose	6	13	12	1		4	575	200	240	9
Santa Barbara	1	3	3				29	8	8	
Stockton	1	13	8	5		2	39	39		

[1] Includes 1,820 cases not classified according to disease.

Reports of clinics, including those operating under the joint control of the United States Public Health Service and State boards of health, July 1, 1922–June 30, 1923—Contd.

State and city.	Total monthly reports received.	Patients admitted.				Patients discharged as non-infectious.	Treatments given.	Doses of arsphenamin administered.	Wassermann tests made.	Microscopic examinations, gonococcus.
		Total.	Syphilis.	Gonorrhea.	Chancroid.					
Colorado	107	1,298	604	659	35	805	24,586	5,248	2,503	3,074
Buena Vista	12	23	11	12		25	381	168	116	6
Colorado Springs	12	57	36	20	1	20	843	225	149	28
Denver (2)	24	929	453	459	17	589	18,174	3,743	1,846	2,847
Fort Collins	11	15	4	11		20	375	44	30	23
Greeley	12	36	12	20	4	21	410	133	86	49
Leadville	12	20	2	17	1	14	1,009	14	11	101
Pueblo	12	188	76	100	12	96	3,065	835	255	18
Trinidad	12	30	10	20		20	329	86	10	2
Connecticut	71	894	357	510	27	757	18,199	3,779	1,706	2,017
Bridgeport	12	139	75	64		113	6,117	924	194	393
Hartford	12	194	49	143	2	163	3,681	823	193	357
New Haven	12	130	63	67		55	4,812	1,302	583	142
New London	11	22	15	7		25	678	106	64	60
Stamford	12	369	132	214	23	383	2,281	399	628	1,035
Waterbury	12	40	23	15	2	18	630	225	44	30
Delaware	23	199	70	122	7	72	2,856	709	310	236
Dover	12	67	26	36	5	49	643	353	92	55
Wilmington	11	132	44	86	2	23	2,213	356	218	181
District of Columbia	16	[1] 1,883	49	14			4,390	3,599	1,797	17
Washington	4	63	49	14			663	382	80	17
Health department	12	[1] 1,820					3,727	3,217	1,717	
Florida	102	1,510	958	437	115	634	8,877	3,878	2,472	576
Alton	5	41	14	27		32	167	81		56
Arcadia	1	3	3				70	33		
Fort Pierce	11	61	35	24	2	40	512	152	39	23
Inverness	5	3	3				19		2	1
Jacksonville (2)	15	689	519	137	33	97	2,911	1,974	1,349	83
Loughridge	2	11	5	5	1	17	101	53	20	
Mayo	1	3	1	2			6	2		2
Ocala	11	3	3				11	9	2	
Perry	11	204	97	62	45	178	1,347	109	8	14
Sanford	8	45	16	20	9	34	397	97	17	20
Tampa	12	265	213	38	14	158	2,518	1,196	894	192
Wauchula	10	57	8	48	1	78	452	92	62	120
West Palm Beach	11	128	42	76	10		366	80	79	65
Georgia	84	3,023	2,138	751	134	708	28,450	11,196	7,928	795
Atlanta	12	1,187	994	193		64	9,181	4,012	4,025	35
Augusta	12	244	76	157	11	20	7,327	1,195	1,275	399
Brunswick	12	73	69	4		48	570	203	242	84
Columbus	12	171	90	71	10	39	874	416	149	94
Macon	12	648	308	236	104	213	6,680	2,254	807	99
Rome	12	117	82	33	2	109	790	524	203	9
Savannah	12	583	519	57	7	215	3,028	2,592	1,227	75
Illinois	318	9,348	3,839	5,101	408	4,600	165,528	38,750	19,953	21,234
Alton	12	168	66	98	4	127	3,768	300	211	277
Cairo	12	83	58	25		36	1,833	896	420	67
Carlinville	12	216	70	144	2	210	1,618	449	286	828
Chicago (14)	142	7,554	2,944	4,245	365	3,372	126,694	24,531	16,865	17,652
Chicago Heights	8	16	7	8	1	9	436	136	48	19
Decatur	12	116	67	49		100	2,060	583	225	317
East St. Louis	12	255	112	128	15	123	4,043	448	368	675
Litchfield	12	31	10	21		27	1,715	146	60	316
Moline	12	98	55	43		54	2,925	1,832	154	76
Peoria	12	118	64	52	2	50	2,159	389	153	105
Princeton	12	14	7	6	1	6	201	126	27	28
Quincy	12	86	44	41	1	42	2,461	497	148	232
Rockford	12	71	35	34	2	52	1,926	688	171	108
Rock Island	12	167	86	80	1	106	6,481	2,994	291	304
Springfield	12	315	209	96	10	246	5,337	4,586	466	226
West Hammond	12	40	5	31	4	40	1,871	89	60	4

Reports of clinics, including those operating under the joint control of the United States Public Health Service and State boards of health, July 1, 1922–June 30, 1923—Contd.

State and city.	Total monthly reports received.	Patients admitted.				Patients discharged as non-infectious.	Treatments given.	Doses of arsphenamin administered.	Wassermann tests made.	Microscopic examinations, gonococcus.
		Total.	Syphilis.	Gonorrhea.	Chancroid.					
Indiana	198	3,735	1,670	1,946	119	2,229	153,394	21,126	8,517	12,299
Anderson	12	167	62	105		149	7,063	1,209	599	400
Columbus	12	40	26	14		19	800	126	53	44
Elwood	6	64	32	30	2	21	560	88	59	35
Evansville	12	579	206	359	14	279	11,517	3,092	919	386
Fort Wayne	12	235	79	143	13	282	6,744	1,149	731	463
Hammond	12	214	67	124	23	164	5,787	637	294	42
Indianapolis (2)	24	1,248	610	599	39	671	97,794	6,285	2,763	1,142
Kokomo	12	75	37	38		51	1,159	587	138	81
Madison	12	55	15	36	4	40	1,127	106	41	19
Marion	12	65	23	37	5	39	1,802	549	51	
Michigan City	12	55	28	19	8	16	439	100	78	125
Muncie	12	148	57	91		106	31,349	1,098	157	165
New Castle	12	37	12	24	1	29	393	297	328	94
Richmond	12	63	25	38		46	1,163	502	190	64
South Bend	12	259	144	108	7	72	7,288	2,565	1,121	480
Terre Haute	12	431	247	181	3	245	6,409	2,736	995	242
Iowa	120	1,254	705	540	9	1,015	24,669	6,961	3,037	2,009
Clinton	11	68	23	39	6	60	640	141	74	18
Council Bluffs	12	37	22	14	1	46	977	228	69	49
Davenport	12	150	102	48		80	3,352	1,035	655	156
Des Moines	12	519	274	244	1	253	15,090	2,212	1,288	1,044
Dubuque	12	44	25	18	1	121	680	226	272	74
Fort Dodge	12	12	7	5		4	189	141	7	6
Marshalltown	12	22	5	17		35	549	158	94	135
Mason City	2					1	19	19		
Ottumwa	12	44	44			13	244	156	43	10
Sioux City (2)	23	358	203	155		402	2,929	2,645	535	517
Kansas	108	1,071	708	358	5	448	14,436	3,892	1,866	1,689
El Dorado	12	144	63	79	2	219	3,745	537	137	541
Junction City	12	1		1		1	28	10	13	74
Kansas City (2)	24	93	76	15	2	7	1,118	333	209	39
Lawrence	12	21	8	12	1	4	480	35	100	200
Rosedale	12	497	361	136		1	3,057	1,076	653	66
Topeka	12	113	65	48		55	2,344	775	238	257
Wichita (2)	24	202	135	67		161	3,664	1,126	516	512
Kentucky	176	4,004	2,206	1,701	97	1,682	49,954	18,908	5,954	3,977
Ashland	12	133	96	37		16	4,665	2,222	381	1,740
Covington	12	208	90	117	1	111	3,723	632	238	138
Frankfort	12	697	375	322		621	8,036	5,972	1,360	560
Fulton and Hickman	12	58	39	19		17	920	428	125	103
Georgetown	12	42	29	12	1	49	665	285	143	13
Harlan	9	34	31	3		7	192	184	93	4
Henderson	12	42	40	2		13	1,561	625	210	5
Lexington	12	448	368	71	9	354	3,238	2,377	800	191
Louisville	11	1,473	584	844	45	63	14,905	2,985	761	351
Madisonville	2	9	4	5		1	98	33	10	17
Maysville	12	23	10	13		30	554		21	9
Mount Sterling	7	29	20	8	1	13	126	17	33	11
Newport	11	124	72	46	6	64	4,962	374	306	198
Owensboro	11	55	44	8	3	77	1,362	578	150	47
Paducah	8	390	269	100	21	149	3,057	1,333	685	303
Paintsville	4	15	7	8		7	98	39	70	59
Pineville and Middleboro	9	151	90	51	10	40	1,230	573	463	156
Winchester	8	73	38	35		50	562	251	105	72
Louisiana	83	6,125	3,426	2,402	297	2,416	70,828	19,662	7,013	2,656
Alexandria	12	785	244	525	16	189	22,506	1,542	549	800
Baton Rouge	12	210	120	74	16	66	2,291	175	27	252
Monroe	12	616	604	12		226	4,320	4,164	1,061	23
New Orleans (2)	24	3,318	1,655	1,454	209	743	30,296	8,986	3,929	869
Shreveport (2)	23	1,196	803	337	56	1,192	11,415	4,795	1,447	712

Reports of clinics, including those operating under the joint control of the United States Public Health Service and State boards of health, July 1, 1922–June 30, 1923—Contd.

State and city.	Total monthly reports received.	Patients admitted.				Patients discharged as noninfectious.	Treatments given.	Doses of arsphenamin administered.	Wassermann tests made.	Microscopic examinations, gonococcus.
		Total.	Syphilis.	Gonorrhea.	Chancroid.					
Maine	48	265	168	94	3	123	4,361	1,377	909	415
Bangor	12	86	73	12	1	26	1,155	658	129	23
Bath	12	8	8			2	725	80	246	118
Calais	12	101	55	46		85	1,645	399	476	19
Portland	12	70	32	36	2	10	836	240	58	255
Maryland	96	2,504	1,042	1,364	98	547	42,410	12,103	3,742	4,187
Annapolis	12	164	41	123		127	1,807	400	164	153
Baltimore (3)	36	1,806	759	959	88	232	30,004	9,385	2,735	2,624
Cambridge	12	85	47	36	2	33	826	364	98	45
Crisfield	6	28	11	16	1	15	144	39	23	13
Cumberland	12	189	61	122	6	94	6,719	739	276	333
Easton	1	2	2			1	10		4	
Hagerstown	12	228	120	107	1	43	2,796	1,159	433	1,012
Kitzmiller	2	1	1			2	88	17	9	7
Prince Frederick	3	1		1			16			
Massachusetts	378	5,724	3,876	1,844	4	1,815	138,150	43,888	21,622	15,195
Attleboro	9	17	6	11		13	170	134	61	20
Boston (8)	79	3,944	2,712	1,231	1	1,099	92,496	30,353	12,031	13,131
Brockton	12	49	41	8		43	1,350	469	238	19
Fall River	12	115	50	65		5	5,390	615	226	399
Fitchburg	5	19	7	12		4	166	54	18	13
Framingham	10	9	9				68	68	11	3
Hathorne	12	62	61	1		34	1,081	849	712	23
Haverhill	12	60	21	39		33	1,823	312	72	34
Holyoke	12	27	21	6		72	742	321	86	3
Lawrence	12	114	50	64		9	1,882	474	208	
Lowell	12	144	72	71	1	92	4,842	847	755	214
Lynn	12	114	63	51		18	3,055	693	308	174
Medfield	12	20	20			38	405	92	185	
Monson	12	18	18			13	266	129	98	
New Bedford	12	300	201	98	1	46	6,009	1,236	457	57
Northampton	12	15	15			14	633	101	320	
North Grafton	12	25	25			3	1,273	10	330	
Pittsfield	12	9	5	4		8	224	56	30	34
Rutland	12	12	12			8	18	18	484	
Salem	12	83	56	27		47	1,451	1,078	366	215
South Boston	12	26	26			39	740	587	147	
Springfield	12	97	67	29	1	18	2,418	1,014	195	55
Taunton	11	49	49				982	789	720	8
Tewksbury	12	194	143	51		148	6,090	761	1,870	474
Westboro	12	38	38			19	933	933	530	154
Worcester (3)	36	190	114	76		31	3,643	1,895	1,164	165
Michigan	200	6,621	3,474	3,123	24	1,982	129,824	24,312	22,902	23,860
Ann Arbor	9	376	375		1	347	3,318	3,098	1,722	
Battle Creek	12	119	57	62		127	1,853	502	245	298
Bay City	12	32	5	27		26			14	166
Detroit (3)	36	4,877	2,444	2,428	5	510	104,941	15,031	17,258	20,721
Escanaba	12	68	14	54		68	2,279	465	55	
Flint	12	256	160	95	1	16	2,399	810	1,055	290
Grand Rapids (2)	17	264	89	170	5	358	3,417	1,048	332	256
Ironwood	4	9	1	8		10	117		5	54
Ishpeming	5	11	4	7		9	235	34	8	91
Jackson	12	183	131	49	3	210	4,489	1,536	1,187	578
Kalamazoo	12	83	33	44	6	79	1,046	253	137	154
Lansing	12	113	59	54		111	1,542	427	378	286
Marquette	5	3	2	1		1	57	25	7	23
Muskegon	12	91	26	62	3	54	1,105	178	76	197
Pontiac	12	64	40	24		2	651	289	173	345
Saginaw	12	59	29	30		52	2,334	288	246	374
St. Joseph	4	13	5	8		2	93	28	4	27
Minnesota	58	925	404	520	1	691	24,060	6,042	2,200	1,337
Duluth	11	316	96	220		111	7,330	1,144	458	690
Minneapolis (2)	24	411	194	216	1	219	9,830	2,304	656	261
St. Paul	11	110	57	53		356	6,140	2,413	1,009	328
South St. Paul	12	88	57	31		5	760	181	77	58

Reports of clinics, including those operating under the joint control of the United States Public Health Service and State boards of health, July 1, 1922–June 30, 1923—Contd.

State and city.	Total monthly reports received.	Patients admitted.				Patients discharged as non-infectious.	Treatments given.	Doses of arsphenamin administered.	Wassermann tests made.	Microscopic examinations, gonococcus.
		Total.	Syphilis.	Gonorrhea.	Chancroid.					
Mississippi	39	1,857	1,223	572	62	1,319	12,337	5,534	1,591	1,573
Hattiesburg	12	295	174	121		119	4,045	871	806	563
Jackson	3	208	85	88	35	113	1,221	693	372	150
Laurel	12	945	650	269	26	916	2,876	1,220		712
Meridian	12	409	314	94	1	171	4,195	2,750	413	148
Missouri	187	5,674	2,418	2,777	479	2,605	74,368	11,012	9,858	2,520
Columbia	8	9	9			3	98	25	31	
Flat River	6	27	19	8		2	200	87	44	19
Hannibal	4	16	4	12		26	428	88	20	49
Joplin	12	92	36	51	5	167	1,963	370	235	273
Kansas City (7)	73	1,517	1,017	438	62	129	14,463	6,293	3,063	800
New Madrid	6	38	18	20		2	129	58		6
Sedalia	12	102	35	61	6	84	1,246	357	217	105
Springfield	12	282	109	166	7	126	4,738	699	212	152
St. Joseph	12	296	116	180		20	3,522	514	306	186
St. Louis (5)	42	3,295	1,055	1,841	399	2,046	47,581	2,521	5,730	930
Montana	24	51	30	21		37	292	168	11	53
Billings	12	23	10	13		28	138	51	10	21
Great Falls	12	28	20	8		9	154	117	1	3
Nebraska	72	1,070	454	551	65	523	30,871	4,986	3,606	4,716
Fremont	12	41	10	29	2	42	624	121	84	76
Hastings	12	30	3	27		32	1,669	58	42	324
Lincoln	12	250	74	174	2	95	10,465	1,707	987	2,851
Omaha (2)	24	722	354	311	57	336	17,265	2,882	2,461	1,418
Winnebago	12	27	13	10	4	18	848	218	32	47
New Hampshire	48	138	69	68	1	81	6,242	1,140	550	322
Concord	12	19	12	7		41	453	440	119	4
Dover	12	14	10	4		11	213	69	14	10
Manchester	12	80	30	49	1	27	5,229	372	260	285
Nashua	12	25	17	8		2	347	259	157	23
New Jersey	211	2,211	1,384	810	17	986	46,087	14,140	6,801	3,507
Atlantic City	12	264	162	102		133	4,003	2,801	575	1,255
Bayonne	12	21	21			11	309	284	64	6
Camden (2)	21	359	212	145	2	58	4,950	1,845	2,001	129
Elizabeth	12	44	36	8		8	893	841	137	69
Greystone Park	12	24	19	5		12	425	377	200	19
Long Branch	12	111	89	22		51	1,451	400	387	55
Montclair	12	35	34	1		19	440	376	152	
Morristown	12	31	28	3			263	156	98	16
Mount Holly	2	2	2				12	5		
Newark	12	717	367	344	6	515	18,913	2,444	1,239	1,612
Orange	12	126	82	38	6	49	3,529	1,393	761	111
Passaic	12	23	22	1		2	698	262	130	6
Paterson (2)	24	119	93	24	2	23	2,924	1,159	233	9
Plainfield	12	105	82	22	1	31	2,135	649	276	43
Spring Lake	8	15	15				257	250	32	
Trenton	12	178	98	80		65	4,431	810	460	138
Weehawken	12	37	22	15		9	454	88	56	39
New Mexico	13	42	29	8	5	27	387	232	83	47
Albuquerque	12	38	27	7	4	27	376	223	80	46
Santa Fe	1	4	2	1	1		11	9	3	1
New York	476	4,148	2,271	1,672	205	3,053	107,902	29,375	10,478	6,424
Albany (4)	42	314	152	141	21	150	3,632	1,200	326	158
Amsterdam	12	49	16	32	1	46	1,217	322	52	68
Auburn	6	36	36			15	253	91	108	
Beacon	11	7	7			3	40	40	5	
Binghamton	12	77	57	20		50	3,358	1,174	346	35
Buffalo	12	1,049	498	408	143	671	32,932	4,373	2,381	3,690

Reports of clinics, including those operating under the joint control of the United States Public Health Service and State boards of health, July 1, 1922–June 30, 1923—Contd.

State and city.	Total monthly reports received.	Patients admitted.				Patients discharged as non-infectious.	Treatments given.	Doses of arsphenamin administered.	Wassermann tests made.	Microscopic examinations, gonococcus.
		Total.	Syphilis	Gonorrhea.	Chancroid.					
New York—Contd.										
Cohoes	11	31	14	11	6	12	667	306	46	3
Corning	10	11	10	1		16	248	133	4	
Dunkirk	12	14	13	1		5	221	33	44	9
Elmira	11	83	59	24		158	1,821	844	174	31
Glen Falls	12	62	33	29		56	2,283	560	154	73
Gloversville	12	32	20	11	1	34	757	507	71	67
Hornell	12	41	39	2		93	1,271	442	155	4
Ithaca	12	140	35	104	1	154	1,965	490	127	515
Jamestown	12	59	35	24		74	1,464	417	142	50
Little Falls	12	11	11			29	207	98	21	
Middletown	12	56	45	11		47	2,286	497	49	3
Newburgh	9	9	9			5	178	42	12	
New Rochelle	12	83	49	32	2	78	1,900	318	156	161
Niagara Falls	12	116	61	43	12	201	2,230	849	298	162
North Tonawanda	8	9	7	2		3	293	74	23	
Olean	12	36	34	2		18	321	175	11	
Oswego	12	33	29	4		28	1,543	629	74	
Plattsburg	12	24	23	1		17	342	172	45	11
Port Chester	12	32	19	12	1	25	802	188	93	27
Poughkeepsie	12	43	38	5		85	978	420	166	77
Rochester (5)	42	546	390	153	3	82	22,773	9,803	3,001	398
Rome	12	42	27	14	1	26	1,133	529	145	24
Saratoga	9	14	11	3		1	138	31	16	2
Schenectady	12	103	50	48	5	68	1,860	417	136	101
Syracuse (2)	24	521	213	307	1	360	7,617	1,682	1,094	359
Troy	12	97	41	53		69	1,578	576	184	67
Utica	12	164	79	85		220	4,432	994	335	121
Watertown	6	8	8				41	25	9	
White Plains	11	29	19	10		38	351	233	84	2
Yonkers	12	167	81	79	7	116	4,770	691	391	206
North Carolina	72	2,156	1,432	651	73	1,289	15,075	8,908	3,122	741
Asheville	12	313	139	136	38	218	1,697	594	223	39
Charlotte	12	491	243	248		96	4,746	3,082	1,122	343
Fayetteville	12	229	216	13		162	1,091	1,023	309	201
Raleigh	12	202	187	15		268	2,312	870	376	2
Wilmington	12	491	376	108	7	227	1,748	1,745	831	47
Winston-Salem	12	430	271	131	28	318	3,481	1,594	261	109
North Dakota	18	29	8	21		29	517	146	58	204
Grand Forks	6	2	1	1			84	66	15	10
Minot	12	27	7	20		29	433	80	43	194
Ohio	325	8,711	4,457	3,932	322	2,526	150,946	25,450	18,798	18,366
Akron	11	1,073	413	536	124	414	23,645	3,149	2,025	2,713
Alliance	6	35	12	22	1	183	383	91	56	15
Athens	11	45	45			12	1,081	235	234	
Canton	8	40	40			4	300	105	137	
Chillicothe	11	9	9			10	130	130	13	
Cincinnati (2)	17	1,083	661	376	46	45	10,862	2,457	1,932	243
Cleveland (7)	67	3,976	1,891	2,029	56	662	66,961	7,685	7,323	6,049
Columbus (4)	43	485	365	120		145	7,818	2,778	2,217	643
Dayton (4)	37	378	288	89	1	107	6,907	3,130	1,355	327
East Liverpool	12	234	60	159	15	311	4,095	652	256	381
Hamilton	7	22	18	4		3	167	115	35	23
Lima (2)	17	68	38	30		4	4,273	571	120	57
Massillon	4	47	47			28	251	251	199	28
Portsmouth	11	237	72	118	47	219	2,348	362	147	55
Port Clinton	11	1	1				7	7	140	2
Springfield (2)	20	153	69	82	2	147	1,034	357	164	313
Toledo	11	624	267	327	30	215	18,006	2,237	1,867	7,373
Youngstown (3)	21	201	161	40		17	2,678	1,137	578	144
Oklahoma	27	903	521	345	37	458	21,217	5,304	986	546
Chickasha	12	323	141	145	37	375	5,480	655	420	423
Oklahoma City	6	437	276	161		22	7,681	2,249	421	81
Tulsa	9	143	104	39		61	8,056	2,400	145	42
Oregon	12	639	327	307	5	55	5,889	1,471	1,668	773
Portland	12	639	327	307	5	55	5,889	1,471	1,668	773

Reports of clinics, including those operating under the joint control of the United States Public Health Service and State boards of health, July 1, 1922–June 30, 1923—Contd.

State and city.	Total monthly reports received.	Patients admitted.				Patients discharged as non-infectious.	Treatments given.	Doses of arsphenamin administered.	Wassermann tests made.	Microscopic examinations, gonococcus.
		Total.	Syphilis.	Gonorrhea.	Chancroid.					
Pennsylvania	564	5,635	3,191	2,326	118	4,422	97,458	29,223	15,174	5,485
Allentown	12	364	290	73	1	444	4,969	2,371	946	363
Altoona	12	112	54	58		86	2,261	146	126	112
Beaver Falls	11	20	16	4		2	225	97	45	20
Bethlehem	12	140	118	21	1		1,789	1,240	420	139
Butler	12	62	23	38	1	50	1,071	134	104	61
Carlisle	12	54	44	10		3	648	587	48	54
Chambersburg	12	136	62	73	1	25	1,112	257	87	135
Chester	11	132	80	44	8	45	1,867	750	169	124
Clearfield	12	22	18	4		77	327	52	79	22
Coatesville	12	78	49	28	1	44	954	394	215	74
Du Bois	12	74	39	35		28	2,400	1,340	563	74
Easton	12	57	31	26		38	1,341	266	253	57
Erie	12	302	182	117	3	180	5,249	1,440	965	299
Greensburg	12	120	106	14		137	3,429	777	1,107	120
Hazleton	12	34	23	11		20	964	71	113	34
Johnstown	12	160	67	88	5	81	1,717	485	224	155
Lancaster (2)	24	115	82	33		65	2,021	400	415	115
Lebanon	11	17	11	6		130	453	159	18	17
McKeesport	12	85	38	47		11	2,918	340	283	85
Mifflintown	10	27	6	17	4	13	159	43	33	43
Monessen	12	50	42	8		1	627	231	202	50
Monongahela	10	11	10	1			337	211	18	11
New Castle	12	80	63	17		23	470	261	102	70
New Kensington	12	72	46	26		19	915	449	201	72
Norristown	8	26	18	8		4	155	81	46	26
Oil City	5	10	5	4	1	2	140	5	2	9
Philadelphia (2)	13	485	230	237	18	405	10,985	2,356	1,802	467
Philipsburg	10	10	10			20	94	87	73	
Phoenixville	9	8	6	2			50			8
Pittsburgh	12	839	463	359	17	1,146	10,089	3,160	1,155	822
Pittston	12	8	5	3			166	22	37	8
Pottsville	12	37	33	4		6	350	305	52	30
Punxsutawney	11	54	33	21		46	1,961	1,165	518	54
Reading (2)	21	359	147	211	1	143	5,527	777	645	358
Rochester	12	21	16	5		3	200	168	49	21
Scranton	12	313	138	164	11	175	7,602	1,751	1,069	302
Shamokin	12	31	11	20		26	1,034	257	106	30
Sharon	12	25	21	4		12	218	148	42	25
Stroudsburg	12	52	30	22		12	468	177	61	49
Sunbury	12	61	40	21		20	1,649	342	161	61
Tunkhannock	11	9	6	3			89	13	12	9
Washington	12	121	60	58	3	163	2,230	389	130	119
West Chester	12	65	37	27	1		327	93	201	63
West Grove	3	4	4				10	5	4	4
Wilkes-Barre (2)	24	462	178	272	12	531	12,542	4,240	1,870	449
Williamsport	12	83	71	12		89	1,147	816	194	83
York	12	228	129	73	26	97	2,172	65	209	202
Rhode Island	84	577	338	231	8	169	14,132	5,747	4,912	1,828
Arctic	12	3	3			4	53	50	7	
Newport	12	15	10	5		9	228	173	30	12
Pawtucket	12	58	36	22		7	2,607	502	186	55
Providence (3)	36	494	286	200	8	147	11,121	4,975	4,677	1,734
Woonsocket	12	7	3	4		2	123	47	12	27
South Carolina	43	3,139	1,390	1,671	78	910	47,227	8,706	3,114	5,985
Columbia	7	478	200	257	21	53	8,690	977	887	2
Greenville	12	670	276	382	12	340	8,155	2,667	993	539
Orangeburg	12	456	263	192	1	214	4,122	1,168	665	
Spartanburg	12	1,535	651	840	44	303	26,260	3,894	569	5,444
South Dakota	24	72	35	36	1	35	491	178	123	131
Aberdeen	12	20	9	10	1	7	229	34	83	56
Sioux Falls	12	52	26	26		28	262	144	40	75
Tennessee	68	4,960	3,059	1,548	353	2,266	81,646	17,766	17,424	6,506
Chattanooga	12	799	442	331	26	240	23,778	3,453	803	1,689
Knoxville	12	832	426	370	36	344	16,027	3,465	1,248	1,060
Memphis	12	1,843	1,485	327	31	837	18,982	6,845	12,987	1,280
Nashville (3)	32	1,486	706	520	260	845	22,859	4,003	2,386	2,477

Reports of clinics, including those operating under the joint control of the United States Public Health Service and State boards of health, July 1, 1922–June 30, 1923—Contd.

State and city.	Total monthly reports received.	Patients admitted.				Patients discharged as non-infectious.	Treatments given.	Doses of arsphenamin administered.	Wassermann tests made.	Microscopic examinations, gonococcus
		Total	Syphilis.	Gonorrhea.	Chancroid.					
Texas	76	6,034	2,895	2,513	626	4,012	72,087	17,252	9,625	10,747
Austin	4	3	3				12	12	4	
Corpus Christi	7	64	6	46	12	103	1,441	56	1,352	1,468
Dallas	6	888	397	454	37	501	16,492	2,544	744	495
El Paso	12	558	358	166	34	282	16,593	1,635	1,000	887
Fort Worth	11	364	205	147	12	147	1,827	683	384	184
Galveston	12	751	300	259	192	519	8,276	4,372	783	623
Houston	12	2,713	1,223	1,155	335	2,106	20,409	6,350	3,822	4,015
San Antonio	12	693	403	286	4	351	7,037	1,600	1,536	3,075
Utah [2]	16	248	94	151	3	104	4,489	556	461	561
Ogden	8	32	5	25	2	43	2,765	4	16	288
Salt Lake City	8	216	89	126	1	61	1,724	552	448	273
Vermont	48	95	57	38		125	2,228	924	347	30
Barre	12	7	5	2		2	125	87	37	4
Burlington (2)	24	78	42	36		74	1,743	615	211	8
Rutland	12	10	10			49	360	222	99	18
Virginia	130	3,321	2,059	1,192	70	1,785	55,128	15,366	10,887	4,040
Alexandria	12	160	60	100		109	6,766	1,604	440	361
Charlottesville	12	373	258	107	8	311	6,603	1,727	4,043	501
Danville	12	93	64	27	2	44	578	344	317	73
Lynchburg	12	290	92	174	24	261	3,012	475	280	523
Newport News	12	210	153	57		194	11,040	2,115	978	646
Norfolk (2)	14	568	453	98	17	268	7,037	2,833	934	502
Norton	12	330	213	116	1	279	3,758	1,419	377	38
Petersburg	12	284	196	87	1	69	2,756	1,494	615	221
Richmond	12	758	465	286	7	188	11,489	2,752	2,811	1,144
Roanoke	12	248	102	136	10	57	2,071	603	58	
South Boston	2									
Staunton	6	7	3	4		5	15		34	31
Washington	30	1,151	501	648	2	587	23,598	4,600	6,489	5,706
Seattle	12	695	319	374	2	185	11,039	3,078	4,985	2,880
Spokane	12	402	160	242		392	12,256	1,458	1,484	2,636
Tacoma	6	54	22	32		10	303	64	20	190
West Virginia	74	826	485	332	9	294	7,794	3,047	1,320	87
Beckley	6	50	46	4		23	257	202	220	9
Charleston (2)	14	330	177	149	4	110	3,077	944	498	334
Clarksburg	11	108	71	37		25	877	494	118	117
Huntington	10	145	54	90	1	93	852	218	146	161
Logan	1	2	2			1	9	9		
Morgantown	7	33	21	11	1	24	326	110	45	84
Oak Hill	2	20	8	12		5	29	8	21	12
Point Pleasant	7	3	3			1	27	27	7	
Richwood	7	12	12			8	62	62		
Wheeling	9	123	91	29	3	4	2,278	973	265	153
Wisconsin	155	982	474	494	14	459	10,488	3,210	5,362	3,549
Beloit	11	31	19	12		28	632	271		
Green Bay	12	19	13	6		17	150	56	33	
Janesville	12	35	15	18	2	17	610	136	75	49
Kenosha	12	23	8	15		12	142	77	104	90
La Crosse	12	56	22	34		14	938	133	156	240
Madison	12	55	16	39		17	253	189	131	147
Milwaukee (3)	36	595	319	265	11	246	5,046	1,785	4,418	2,282
Oshkosh	12	17	10	7		13	478	128	39	105
Racine	12	58	21	34		18	436	169	162	148
Superior	12	48	24	23	1	37	1,332	218	185	347
Wausau	12	45	4	41		40	471	48	59	141
Wyoming	11	103	53	46	4	26	1,257	285	269	153
Casper	11	103	53	46	4	26	1,257	285	269	153

[2] Venereal disease work in Utah suspended beginning with March, 1923.

On the basis of the number of monthly reports received and of new patients admitted to clinics, the monthly and daily averages of admissions for each State have been obtained and the results tabulated below. Comparison with results given last year shows a slight decrease for 1923 in the monthly average for the United States as a whole. The complete report follows:

Table showing States ranked according to the monthly and daily average admissions per clinic, July 1, 1922–June 30, 1923.

Rank.	State.	Monthly average new admissions per clinic.	Daily average new admissions per clinic.	Rank.	State.	Monthly average new admissions per clinic.	Daily average new admissions per clinic.
	United States	22.3	0.8	23	Minnesota	16.0	0.5
				24	Utah	15.5	.5
1	District of Columbia	117.7	3.9	25	Massachusetts	15.1	.5
2	Texas	79.4	2.7	26	Nebraska	14.9	.5
3	Louisiana	73.8	2.5	27	Florida	14.8	.5
4	South Carolina	73.0	2.4	28	Connecticut	12.6	.4
5	Tennessee	72.9	2.4	29	Colorado	12.1	.4
6	California	57.4	1.9	30	West Virginia	11.2	.4
7	Oregon	53.3	1.8	31	New Jersey	10.5	.4
8	Alabama	49.8	1.7	32	Iowa	10.5	.4
9	Mississippi	47.6	1.6	33	Pennsylvania	10.0	.3
10	Washington	38.4	1.3	34	Kansas	9.9	.3
11	Georgia	36.0	1.2	35	Wyoming	9.4	.3
12	Oklahoma	33.4	1.1	36	New York	8.7	.3
13	Michigan	33.1	1.1	37	Delaware	8.7	.3
14	Missouri	30.3	1.0	38	Rhode Island	6.9	.2
15	Arkansas	30.0	1.0	39	Wisconsin	6.3	.2
16	North Carolina	29.9	1.0	40	Maine	5.5	.2
17	Illinois	29.4	1.0	41	New Mexico	3.2	.1
18	Ohio	26.8	.9	42	South Dakota	3.0	.1
19	Maryland	26.1	.9	43	New Hampshire	2.9	.1
20	Virginia	25.6	.9	44	Montana	2.1	.1
21	Kentucky	22.8	.8	45	Vermont	2.0	.1
22	Indiana	18.9	.6	46	North Dakota	1.6	.1

Reports of other institutions.—Reports from 41 correctional and penal institutions have been received by the division in addition to those from the clinics already discussed. The work of these institutions may be tabulated as follows:

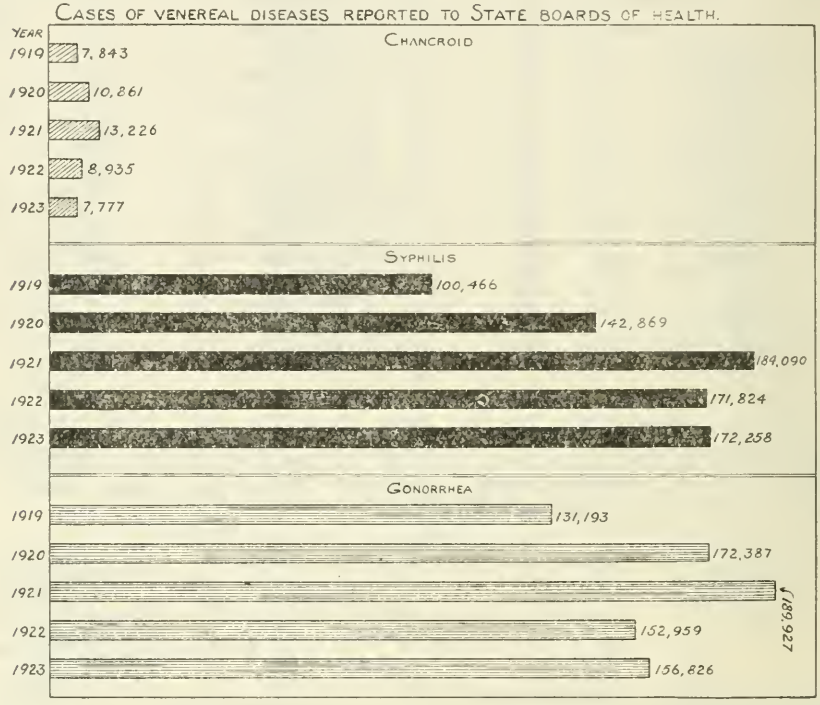
Patients admitted:	
Syphilis	2,535
Gonorrhea	2,273
Chancroid	98
Total	4,906
Patients discharged as noninfectious	3,431
Treatments given	204,787
Doses of arsphenamin administered	19,177
Wassermann tests made	17,963
Microscopic examinations for gonococcus infection	8,474

Clinic study.—The performance of 441 venereal-disease clinics based upon the monthly clinic reports received during the fiscal year 1922 is being studied by the division, with a view to determining the value of the work being done from the standpoint of the patient receiving treatment. This study, which is nearing completion, will be of value as a basis for the preparation of a standard for clinic procedure and efficiency. The conclusions derived from this study will also give each clinic a standard with which to compare the quality of its work.

REPORTING OF VENEREAL DISEASES.

The State boards of health reported a total of 338,681 cases of venereal diseases in 1923, an increase of 4,963, or of about 1 per cent over the number reported in 1922. This total included 1,820 cases which were not classified according to disease. Of the remainder, 172,258 were cases of syphilis, 156,826 cases of gonorrhea, and 7,777 were cases of chancroid. Comparison with the totals reported in 1922 brings out the fact that the increase for gonorrhea is nearly 10 times that for syphilis. Cases of chancroid have decreased nearly 13 per cent in 1923. Syphilis is still in excess of gonorrhea in the reports received.

The accompanying diagram indicates the progress in venereal-disease reporting since 1919:



This increase in the cases reported by physicians to State boards of health in the face of the consensus of opinion that there has been a diminution in the number of new infections indicates a more satisfactory cooperation on the part of the physicians. It is hoped that this indication of a growing appreciation by medical men of the importance of notifying the health authorities of cases which are a menace to the public health will appear more definitely in the results of the work of the coming year.

Below are the tabulated reports received from the States:

Cases of venereal diseases reported to State boards of health, July 1, 1922–June 30, 1923.

State.	Total.	Syphilis.	Gonorrhea.	Chancroid.
United States	[1] 338,681	172,258	156,826	7,777
Alabama	11,345	6,634	4,466	245
Arizona [2]	219	101	107	11
Arkansas	5,221	2,944	2,119	158
California	11,054	5,616	5,436	2
Colorado	2,460	844	1,515	101
Connecticut	1,334	711	623	[3]
Delaware	598	305	267	26
District of Columbia	[1] 1,883	49	14	
Florida	3,384	1,923	1,277	184
Georgia	9,771	5,234	4,025	512
Idaho	263	67	195	1
Illinois	26,504	10,341	15,354	809
Indiana	4,769	2,189	2,433	147
Iowa	3,489	1,314	2,142	33
Kansas	2,837	1,242	1,590	5
Kentucky	33,213	21,360	11,544	309
Louisiana	7,670	4,064	3,181	425
Maine	1,317	418	885	14
Maryland	5,628	2,245	3,183	200
Massachussetts	12,872	5,168	7,700	4
Michigan	18,869	8,818	9,898	153
Minnesota	10,933	4,597	6,230	106
Mississippi	16,881	7,131	9,681	69
Missouri	10,374	4,268	5,172	934
Montana	586	150	433	3
Nebraska	4,491	1,124	3,178	189
Nevada [4]				
New Hampshire	424	149	271	4
New Jersey	5,208	2,988	2,157	63
New Mexico	409	131	268	10
New York	36,296	25,152	10,854	290
North Carolina	8,067	4,299	3,536	232
North Dakota	1,099	261	838	
Ohio [5]	9,794	5,165	4,230	399
Oklahoma	2,497	1,152	1,260	85
Oregon	3,209	1,008	2,147	54
Pennsylvania	6,170	3,413	2,639	118
Rhode Island	969	450	510	9
South Carolina	4,867	2,203	2,553	111
South Dakota	822	200	613	9
Tennessee	6,862	3,584	2,865	413
Texas	29,108	16,637	11,339	1,132
Utah [6]	439	133	301	5
Vermont	487	223	264	
Virginia	4,276	2,321	1,876	79
Washington	1,573	639	928	6
West Virginia	4,982	2,670	2,223	89
Wisconsin	3,055	570	2,460	25
Wyoming [5]	103	53	46	4

[1] Includes 1,820 cases not classified according to disease.
[2] For 6 months only.
[3] Included in syphilis.
[4] Not reporting.
[5] For 11 months only.
[6] For 8 months only; veneral disease work in Utah suspended in March, 1923.

A study of the table indicates that New York, Kentucky, Texas, Illinois, and Michigan lead the other States in the number of cases reported. The same States headed the list in 1922. The totals for the two years are as follows:

State.	Total cases venereal disease, 1923.	Total cases venereal disease, 1922.
New York	36,296	33,358
Kentucky	33,213	29,379
Texas	29,108	42,060
Illinois	26,504	15,871
Michigan	18,869	16,249

Eighteen States show an increase in the number of cases reported during the year, ranging from an increase of 67 per cent in Illinois to 0.12 per cent in Georgia. Kentucky and Oregon have reported an increasing number of cases for the last three years. The following table gives the States ranked according to the percentage of increase or decrease in the number of cases reported in 1923 as compared with 1922:

Table showing States ranked according to the percentage of increase or decrease in the number of cases of venereal diseases reported, 1923 over 1922.

STATES SHOWING INCREASE.

Rank.	State.	Per cent.	Rank.	State.	Per cent.
1	Illinois	67.00	10	Michigan	16.12
2	Washington	43.65	11	Iowa	16.02
3	Minnesota (incomplete)	[1] 41.40	12	Arizona (incomplete)	[3] 14.06
4	Oregon	41.12	13	Kentucky	13.05
5	Massachusetts	38.25	14	New Mexico (incomplete)	[4] 9.07
6	Maryland	37.40	15	New York	8.81
7	California (incomplete)	[2] 37.33	16	North Carolina	7.65
8	North Dakota	30.83	17	Wisconsin	5.24
9	Oklahoma	17.07	18	Georgia	.12

STATES SHOWING DECREASE.

19	Kansas	0.28	33	Colorado	26.76
20	South Dakota	1.91	34	Montana	27.02
21	Louisiana	2.22	35	Vermont	28.59
22	Alabama	3.47	36	Texas	30.79
23	New Jersey	5.82	37	South Carolina	31.21
24	Pennsylvania	6.76	38	Idaho	32.74
25	Indiana	7.90	39	West Virginia	38.77
26	Tennessee	9.26	40	Utah (incomplete)	[6] 38.94
27	Ohio (incomplete)	[5] 11.71	41	New Hampshire	42.23
28	Missouri	12.77	42	Delaware	42.39
29	Nebraska	13.13	43	Connecticut	42.87
30	Virginia	14.31	44	Arkansas	48.20
31	Maine	14.98	45	Wyoming (incomplete)	[5] 83.41
32	Florida	17.64			

NOTE.—Owing to a difference in the method of reporting, figures for the District of Columbia, Mississippi, and Rhode Island are not comparable, and have been omitted from the above table.

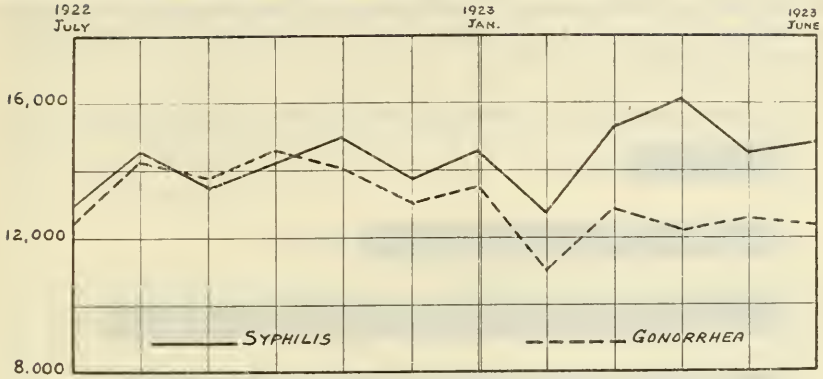
[1] 1922 figures for 9 months only.
[2] 1922 figures for 10 months only.
[3] 1923 figures for 6 months only.
[4] 1922 figures for 11 months only.
[5] 1923 figures for 11 months only.
[6] 1923 figures for 8 months only; venereal disease work in Utah suspended in March, 1923.

The highest point for the year in cases of gonorrhea and syphilis reported was reached in November, 1922, with a total of 29,031 cases; the lowest point was reached in February, 1923, with a total of 23,755. A comparison with the totals for 1922 shows that the same months marked the high and low periods of reporting in both years.

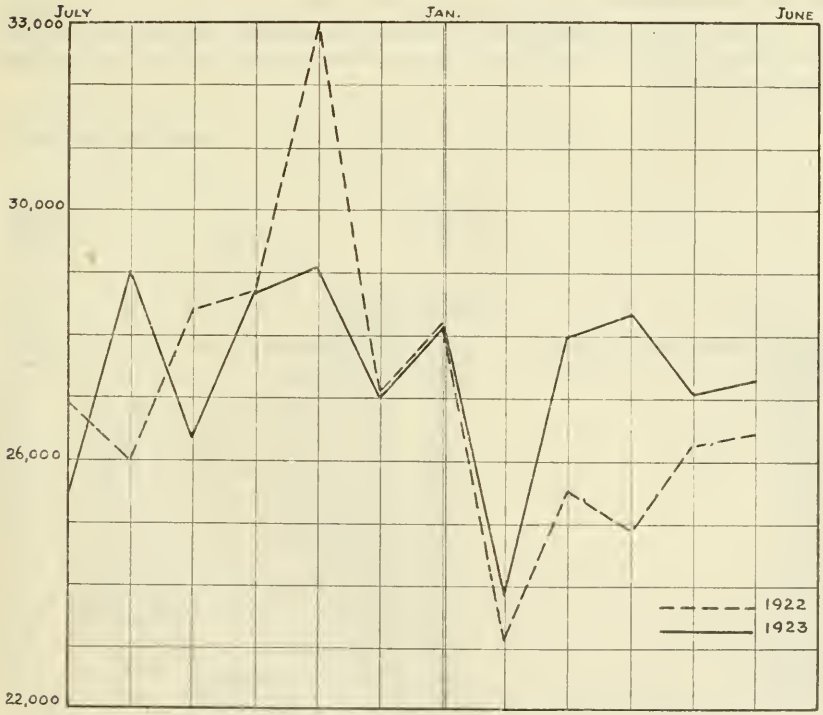
The graph on page 259 indicates the monthly variation in the cases of gonorrhea and syphilis reported in 1923.

DISTRIBUTION OF ARSPHENAMIN.

The State boards of health have distributed 583,772 doses of arsphenamin or similar product during the year 1923, an increase of 66,522 doses, or nearly 13 per cent, of the total distributed in 1922. In 1922, 98 per cent of the total distributed was reported as administered by the clinics. In 1923 the amount administered in the clinics was

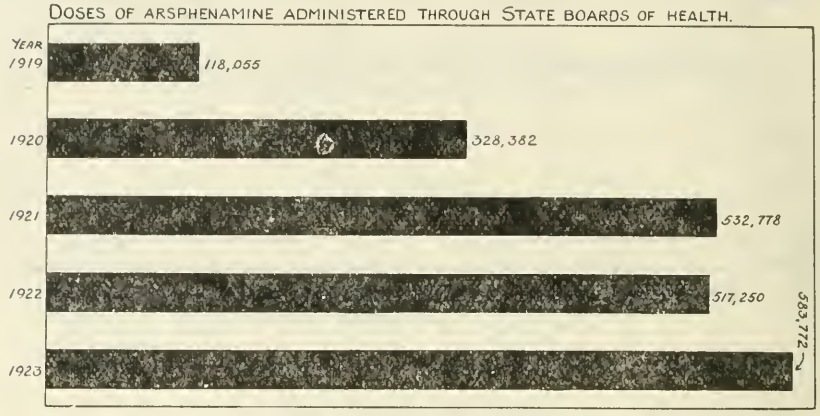


CASES OF SYPHILIS AND GONORRHEA REPORTED TO STATE BOARDS OF HEALTH ACCORDING TO MONTHS.



SYPHILIS AND GONORRHEA—TOTAL CASES REPORTED TO STATE BOARDS OF HEALTH, BY MONTHS AND YEARS.

only 85 per cent of the total distributed. This may be accounted for by the cooperative arrangements which have been made in some of the States with private practitioners whereby treatment is given to indigents free or at a nominal fee and the drugs are furnished by the State board of health.



The accompanying diagram illustrates the variation in the amount of arsphenamin distributed by State boards of health in the last five years. The table gives the amount distributed by each State board of health:

State report of doses of arsphenamin (or similar product) distributed, July 1, 1922–June 30, 1923.

State.	Doses distributed.	State.	Doses distributed.
United States	583,772	Montana	707
		Nebraska	6,138
Alabama	33,312	Nevada [3]	
Arizona [1] (incomplete)	423	New Hampshire	1,142
Arkansas	12,070	New Jersey	14,526
California	27,929	New Mexico	297
Colorado	5,251	New York	30,012
Connecticut	11,832	North Carolina	20,018
Delaware	734	North Dakota	166
District of Columbia [2]	3,599	Ohio [4] (incomplete)	31,832
Florida	4,147	Oklahoma	5,790
Georgia	19,243	Oregon	2,065
Idaho	555	Pennsylvania	31,060
Illinois	42,531	Rhode Island	5,792
Indiana	21,572	South Carolina	8,707
Iowa	8,595	South Dakota	178
Kansas	6,788	Tennessee	17,777
Kentucky	20,186	Texas	18,572
Louisiana	22,435	Utah [5] (incomplete)	566
Maine	1,377	Vermont	938
Maryland	15,007	Virginia	16,119
Massachusetts	45,498	Washington	5,274
Michigan	24,336	West Virginia	3,393
Minnesota	6,042	Wisconsin	3,353
Mississippi	10,934	Wyoming [4] (incomplete)	285
Missouri	14,639		

[1] For 6 months only.
[2] From clinic reports.
[3] Not reporting.
[4] For 11 months only.
[5] For 8 months only; venereal disease work in Utah suspended in March 1923.

Because of the unfavorable reactions still occurring following the use of arsphenamin and neoarsphenamin, due either to errors in the technic of the preparation and administration of the drug or to faulty examination of the patient, especially in relation to the effects of previous injections, standard instructions were prepared by the medical departments of the Army, Navy, Veterans' Bureau, and Public Health Service for the preparation and intravenous administration of arsphenamin and neoarsphenamin. These instructions are available in reprint form and can be secured through the Government Printing office.[1]

SPECIAL MEDICAL FEATURES.

Medical instruction and research.—Instruction in the latest methods of diagnosis and treatment of the venereal diseases has been given at the Public Health Service clinic in Hot Springs, Ark. Since the beginning of this work, 24 physicians have completed courses of instruction ranging from 30 to 90 days in length. These physicians came from 14 different States. Applications for permission to receive instruction at the clinic have been received from 41 other physicians. Some of this number will attend the clinic during the next three months.

Members of the staff of the Public Health Service clinic at Hot Springs, in addition to giving this course of instruction and to carrying on the work of the clinic, are making investigations with a view to improving venereal disease clinic organization and management.

Oregon and Kentucky both held public health institutes which included courses of instruction in the diagnosis and treatment of venereal diseases.

"*Venereal Disease Information.*"—Since 1920 the division has issued each month a mimeographed bulletin of abstracts of articles in current periodical literature on the venereal diseases. At the beginning of the year 1923 this bulletin was being sent to about 250 doctors, health officers, and others who had requested that copies be sent them. Since November, 1922, special original articles have been added to the abstracts. The name of the bulletin was changed to "Venereal Disease Information" and the circulation extended to more than 4,000. The official mailing list now includes the following:

State health departments.
Venereal disease clinicians.
Hospital libraries.
Medical society libraries.
Medical school libraries.
Medical journals.
State hospitals for the insane.
State hospitals for criminal insane.
State penitentiaries.
Public health nurses' associations.
Training schools for nurses.
Social service agencies.
State industrial schools for delinquents.

Since May, 1923, this bulletin has been issued in periodical form by the Government Printing Office. This makes it available to the public at a nominal subscription price of 50 cents per year to cover cost of printing.

[1] Preparation and Administration ofArsphenamin and Neoarsphenamin, Reprint No. 774, Public Health Reports.

The purpose of the division in developing this bulletin is to keep its readers in touch with the progress being made in the medical aspects of the venereal diseases and to emphasize the importance from the viewpoint of prevention, of prompt detection and prompt adequate treatment in all stages of these diseases.

"*Social Pathology.*"—Experience in the control of venereal diseases has shown more and more clearly from year to year the desirability of extending information regarding the causes and the nature of the venereal diseases, as well as the best methods for their control, to the people of the country. This can be done best through reaching their organizations, especially groups in which interest in social conditions exists. Efforts have been made in the past to stimulate interest among such organizations as rotary clubs, chambers of commerce, fraternal organizations, and labor unions in the anti-venereal-disease program. The women's organizations have also been approached. Many of these groups have expressed their interest in this work, not only by cooperating with the State health departments and the Federal Government, but also by working independently through their own organizations. The interest among women in the social aspects of venereal disease has been steadily on the increase, to such an extent that at the present time practically every large organization of women has a section of its program devoted to some aspect of this problem. Committees for the purpose of giving special attention to these activities have been formed within these groups, and the desire of these women to receive and to act upon information and suggestions from the State boards of health and the Public Health Service has been very encouraging.

One of the greatest needs at the present time is to supply to such interested groups authentic information on the venereal diseases and their relation to sociological and economic conditions of present-day life. The community's responsibility for the care of the delinquent and the feeble-minded as potential carriers of venereal disease must be brought out. The effect of prostitution upon the venereal-disease rate and the necessity for control measures must be emphasized. The bearing of crowded housing conditions, intemperance, undesirable working conditions, and numerous other factors in the problem must be mentioned, together with accepted methods of counteracting them.

A new section has been formed within the division, in charge of a woman physician, the function of which is to carry on an informational service along the lines indicated above. As a feature of this work, a periodical bulletin to be known as "Social Pathology" has been proposed. The division hopes to issue this bulletin every other month and to have it contain special articles on the socio-economic aspects of venereal diseases together with abstracts of related articles appearing in current literature, book reviews, programs for community action, forms of model laws and ordinances, and suggestions as to approved methods of sex instruction in the home. The proposal to issue such a bulletin has met with general approval, and it is believed that it may be developed into a very useful instrument in the combined Federal and State program for venereal-disease control.

EDUCATIONAL MEASURES.

The work of popular education in the need for the control of the venereal diseases has again decreased, although not so conspicu-

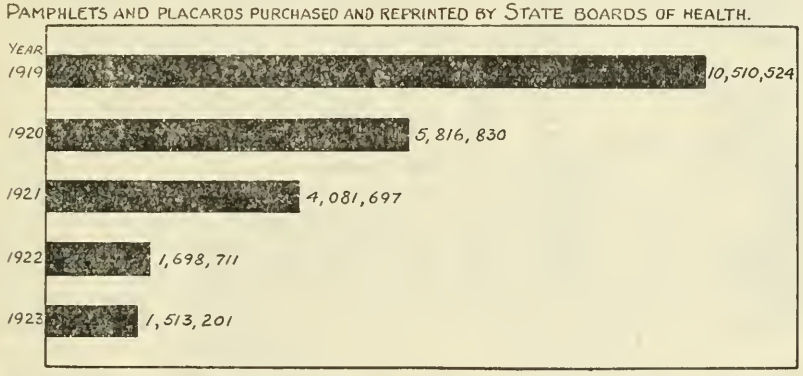
ously as in 1922. As the funds available diminish in amount, the tendency seems to be to spend less for the distribution of exhibits, pamphlets, and other educational material than in the detection and cure of persons already infected. In order to lessen the danger from actively contagious cases, prompt detection and prompt adequate treatment of the infected have been found to be essential in the prevention of these diseases.

GENERAL EDUCATIONAL FEATURES.

Pamphlets.—Requests for pamphlets received by the division and State boards of health totaled 56,260 in 1923, as compared with 85,891 in 1922. Nearly 75 per cent of the requests received by the division were referred to the States boards of health for compliance, whereas 32 per cent of such requests were so handled in 1922.

The number of pamphlets distributed by the division and State boards of health was 1,674,322, a decrease of approximately 27 per cent from the number distributed in 1922.

The State boards of health report the purchase of 1,513,201 pamphlets and placards in 1922. A comparison with the totals for 1921 and 1922 shows a decrease of 11 per cent in 1923 as compared with a falling off of 58 per cent in 1922. The accompanying diagram indicates the variation in the total purchases made during the last five years:



The following table contains the reports of purchases by the various States classified according to the kind of pamphlets bought. The letters A to F stand for the following groups:

A—Men.
B—The general public.
C—Boys.
D—Parents.
E—Girls.
F—Educators.

Educational pamphlets and placards purchased and reprinted by State boards of health, July 1, 1922–June 30, 1923.

State.	Total.	A	B	C	D	E	F	Others.	Placards.
United States	1,513,201	173,780	372,787	283,455	173,105	298,415	47,910	162,950	799
Alabama	44,000	15,000	7,000			10,000		12,000	
Arizona [1]	4,000					4,000			
Arkansas	52,000	50,000	1,000		1,000				
California									
Colorado	21,748		1,700					20,000	48
Connecticut	132		72			60			
Delaware									
District of Columbia	10,500	1,000	5,500			2,000		2,000	
Florida	18,000	5,000		5,000	4,000		4,000		
Georgia	36,100		6,100	20,000		10,000			
Idaho									
Illinois	341,239	60,000	105,000	45,000	65,000	55,000	10,500		739
Indiana	110,000	15,000	45,000	5,000	15,000	30,000			
Iowa	10,000				10,000				
Kansas	4,000			2,000		2,000			
Kentucky	21,000		7,000	5,000		5,000		4,000	
Louisiana	14,000	2,000	2,000					10,000	
Maine									
Maryland	50,000			20,000		30,000			
Massachusetts	16,500		8,000	5,000	1,500			2,000	
Michigan	25,785	4,030	4,180	4,755	5,085	5,525	2,210		
Minnesota	30,000							30,000	
Mississippi	106,000		80,000					26,000	
Missouri	37,000	2,000	10,000			20,000	5,000		
Montana	5,000			2,500	2,500				
Nebraska	85,000		10,000	15,000	20,000	10,000	10,000	20,000	
Nevada [2]									
New Hampshire									
New Jersey	92,055		54,515	5,000	2,000	10,000	50	20,500	
New Mexico	900				500			400	
New York	125,000			100,000		25,000			
North Carolina									
North Dakota	15,000		10,000			5,000			
Ohio									
Oklahoma	7,000	1,250	1,250		2,000	1,500	1,000		
Oregon									
Pennsylvania	13,720	3,500	470	4,200	2,220	3,330			
Rhode Island	7,000	3,000	2,000	2,000					
South Carolina	3,000	1,000	2,000						
South Dakota									
Tennessee	10,000		5,000	5,000					
Texas	15,000							15,000	
Utah									
Vermont	1,000							1,000	
Virginia	30,400			10,000	10,300		10,100		
Washington	5,000					5,000			
West Virginia	16,112	1,000	5,000	3,000	2,000	5,000	50	50	12
Wisconsin	130,000	10,000		25,000	30,000	60,000	5,000		
Wyoming									

[1] For 6 months only. [2] Not reporting.

Illinois was the largest purchaser, according to this table, with a total of 341,239 pamphlets and placards bought. Wisconsin, New York, Indiana, and Mississippi came next in the order named. The largest purchases were made of pamphlets in Groups B, C, and E in 1923, whereas in 1922 Groups A, D, and E were in the lead.

After some time of careful preparation and frequent consultation with experienced educators, the "Manual—High Schools and Sex Education," was issued in the fall of 1922. The book contains: (1) General aspects of the problem, including a statement of the responsibility and the unique position of the school, of methods and supplementary devices for giving sex information, and of the need for special preparation and a cooperative spirit on the part of the teacher; and (2) specific suggestions of ways in which sex education in its broadest intrepretation may be made a part of the school curriculum through the subjects of biology, general science, physiology, physical education, home economics, social studies, and English.

The appendixes contain suggested emergency devices, subjects for lectures, outlines for use in teacher-training institutions, and of courses being offered in high schools at the present time.

Copies of the Manual were sent to a group of several hundred prominent educators, with an individual letter in which specific questions regarding it were asked. Commendation of the book was practically unanimous in the replies received, and many stated that for the first time definite and practical suggestions had been given for the solution of this problem. Approximately 2,000 copies of the Manual have been purchased by educators in addition to the 1,000 copies distributed by the division.

Two venereal-disease bulletins were revised and issued under new numbers:

72. The Need for Sex Education.
73. Warning Against Venereal Diseases (Placard).

A handbook for community leaders has been completed, and is now being printed.

Exhibits and lantern slides.—One set of 60 lantern slides following the outline of the "Youth and Life" exhibit was issued in the fall of 1922. Copy for a set of 70 slides for boys similar to the "Keeping Fit" exhibit was completed, although the slides are not available at the close of the year. Three exhibits were prepared, and will be ready for use in the fall of 1923. They are:

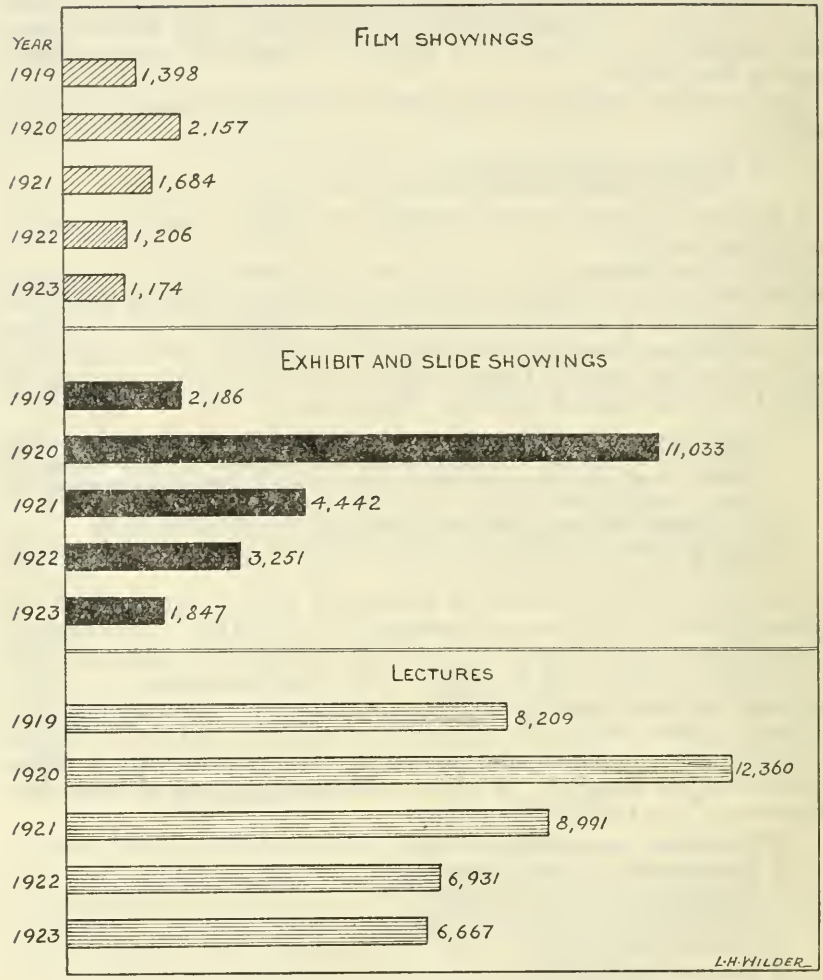
Adolescence and Sex Education—An exhibit for high-school teachers. (This exhibit is for the use of school-teachers and prospective school-teachers in normal schools and universities who desire to equip themselves to give information regarding sex and reproduction to students.)
The Venereal Diseases: A Menace to Mankind—An exhibit for adults.
Youth and Life—An adaptation of the "Youth and Life" exhibit for use with colored girls and young women.

The States have borrowed or purchased 447 exhibits and sets of lantern slides in 1923, as compared with 770 in 1922. The number of showings of exhibits and lantern slides reported in 1923 was 1,847, as compared with 3,251 in 1922. The total attendance at these showings was more than 1,000,000, an average per showing of 549.

Motion-picture films.—The 12 reels of the film entitled "Science of Life" were completed and shown in various States by a representative of the division. A report of his work is given on page 269. The titles of the reels are as follows:

1. Protoplasm, the Beginning of Life.
2. Reproduction in Lower Forms of Life.
3. Reproduction in Higher Forms of Life.
4. Interdependence of Living Things.
5. How Plants and Animals Cause Disease.
6. How Disease is Spread.
7. How to Prevent Disease.
8. How the Mosquito Spreads Disease.
9. The Fly as a Disease Carrier.
10. Personal Hygiene for Young Women.
11. Personal Hygiene for Young Men.
12. General Hygiene.

The States report 57 motion-picture films purchased or borrowed in 1923, an increase of 12 over the previous year. Total showings for the country were 1,174, with an average attendance per showing of 214.


YEAR
FILM SHOWINGS
1919
1,398
1920
2,157
1921
1,684
1922
1,206
1923
1,174
EXHIBIT AND SLIDE SHOWINGS
1919
2,186
1920
11,033
1921
4,442
1922
3,251
1923
1,847
LECTURES
1919
8,209
1920
12,360
1921
8,991
1922
6,931
1923
6,667
L·H·WILDER

The following table gives the amount of exhibit material secured by the States in 1923:

Exhibits, lantern-slide sets, and motion-picture films borrowed or purchased by State boards of health, July 1, 1922–June 30, 1923.

State.	Exhibits.	Slides.	Films.	State.	Exhibits.	Slides.	Films.
United States	418	39	57	Montana	12		
				Nebraska			
Alabama				Nevada [1]			
Arizona				New Hampshire			
Arkansas				New Jersey			
California	1			New Mexico		2	
Colorado				New York	200	10	
Connecticut				North Carolina	12		
Delaware				North Dakota			
District of Columbia	6	3	14	Ohio			
Florida				Oklahoma			
Georgia	10			Oregon	2		
Idaho				Pennsylvania			
Illinois	5		7	Rhode Island			
Indiana			1	South Carolina	8		
Iowa				South Dakota	12	2	
Kansas	12			Tennessee			[2] 10
Kentucky		2		Texas			
Louisiana				Utah			
Maine			1	Vermont			
Maryland				Virginia			
Massachusetts	64	1	2	Washington	1		
Michigan	10	10		West Virginia	[3] 11	3	6
Minnesota	5	2		Wisconsin	12		4
Mississippi		1	8	Wyoming			
Missouri	35	3	2				

[1] Not reporting.
[2] Rented.
[3] Includes 1 steremotorgraph.

The American Social Hygiene Association reports the following sales of service exhibits during the year:

	Total.	Keeping Fit (large).	Keeping Fit (small).	Youth and Life (large).	Youth and Life (small).	Venereal Menace.
Total orders filled	735	6	365	3	352	9
State boards of health	389		186		197	6
Others	346	6	179	3	155	3

The association also reports the sale of 68 sets of lantern slides, 167,300 Public Health Service pamphlets to State boards of health, and 28,327 service pamphlets to other purchasers.

Lectures and addresses.—A total of 6,667 lectures and addresses, with an average attendance of 122, has been reported to the division in 1923. At 782 of these meetings exhibit material was used.

Following is the complete report of educational activities carried on by the State boards of health in 1923:

State report of educational activities, July 1, 1922–June 30, 1923.

State.	Pamphlets distributed.	Lectures.			Film showings.		Exhibit and slide showings.	
		Number.	Average attendance.	Exhibit material used.	Number.	Average attendance.	Number.	Average attendance.
United States	1,568,833	5,722	107	566	1,174	214	1,843	549
Alabama	74,817	264	145		20	304	3	1,933
Arizona[1]	3,868							
Arkansas	27,693	101	126		5	202	416	132
California	37,439	251	125		288	162	156	828
Colorado	7,597	12	123				29	220
Connecticut	2,146	8	121	3				
Delaware	44							
District of Columbia	37,200	[2] 48	65	12	4	5,006	4	5,148
Florida	39,290	87	258	17	2	463	72	1,000
Georgia	10,487	78	447		7	2,543	35	312
Idaho	1,908							
Illinois	112,973	113	137	79	358	192	181	282
Indiana	89,979	61	117	23	3	101	13	127
Iowa	10,470	327	160		62	317	25	4,270
Kansas	16,027	[3] 81	191	59	2	50		
Kentucky	33,936	68	174	2	8	287	10	10,000
Louisiana	19,273	8	73	1	5	232	10	1,500
Maine	4,527	151	118					
Maryland	9,497	18	167	18			38	49
Massachusetts	23,861	53	55		3	278	15	98
Michigan	19,753	267	109	63	12	121	70	67
Minnesota	26,949	32	63		2	223	99	224
Mississippi	49,084	434	67	11	1	500	3	225
Missouri	80,215	106	94		47	322	43	291
Montana	17,363	20	91	7	36	241	27	65
Nebraska	73,185	35	69		6	146	6	179
Nevada[4]								
New Hampshire	1,091	19	71					
New Jersey	65,680	229	131	53				
New Mexico	1,562				2	600		
New York	250,845	518	86	28	6	113	99	1,441
North Carolina	10,779							
North Dakota	4,899				1	200	6	113
Ohio[5]	22,325							
Oklahoma	5,674	19	89				28	133
Oregon	19,579	402	52		150	67		
Pennsylvania	19,942	98	223	1	32	252	38	300
Rhode Island	2,767	5	192				2	200
South Carolina	4,856							
South Dakota	19,337	142	124	104	7	129	14	7,507
Tennessee	64,382	38	89	11			2	70
Texas	42,375							
Utah[6]	2,245						6	12,500
Vermont								
Virginia	36,081	302	136	68				
Washington	964							
West Virginia	11,220	105	87	6	28	216	70	134
Wisconsin	152,649	1,222	59		77	155	323	88
Wyoming								

[1] For 6 months only.
[2] Exclusive of 3 radio talks heard by 20,000 persons.
[3] Exclusive of 1 radio talk.
[4] Not reporting.
[5] For 11 months only.
[6] For 8 months only; venereal disease work in Utah suspended in March, 1923.

New York far outranks the other States in the number of pamphlets distributed, Wisconsin and Illinois being next in order. Wisconsin reported more than twice as many lectures as any other State. New York, Mississippi, and Oregon follow in the order given. Illinois and California report the largest number of film showings, and Arkansas and Wisconsin the largest number of exhibit showings.

Lectures among the colored population.—Intensive work with the colored population was carried on in Virginia, West Virginia, and North Carolina during the year. A total of 730 meetings was reported, with an attendance of 138,653. This is an increase from 1922 of nearly 25,000 persons reached.

SPECIAL EDUCATIONAL FEATURES.

Educators.—The work with educators in 1923 has consisted largely of the distribution of the "Manual—High Schools and Sex Education," to which reference was made on page 264, and the introduction of the film "Science of Life."

The titles of the reels of "Science of Life" were given on page 265. The division prepared the film to fill a need for educational material in which the biology of sex and reproduction and information regarding the dangers of disease to the individual and the race were presented in a form suitable for use in schools and colleges. Much time was spent upon the preparation of the copy and the making of the film. The scientific accuracy of the production was assured by frequent showings before experts. The reels were shown by a representative of the division more than 170 times in 20 different States during the year, to approximately 55,000 persons. The audiences included educators, pupils in high schools, students in colleges and teacher-training schools, health officers, city officials, prominent men and women, and others. Without exception the film as presented by the lecturer was favorably received.

Letters commending the reels and requests from schools and State boards of health for return engagements are numerous. Many requests for literature and information from the field to State boards of health and direct to the division have resulted from these showings. Twenty-four members from one university class sent requests for information on methods of teaching sex education after seeing the film.

It is the purpose of the division to continue the demonstration work in the use of motion-picture films in schools and colleges for instruction in health, hygiene, and sanitation, as well as in the biology of sex and reproduction.

A book for mayors.—A project in which the division had been interested for some time was that of devising some method of presenting the need for controlling the venereal diseases, together with a program of practical value for meeting the situation, in a way that would appeal to the busy city official. With this end in view, a scrap book was prepared, entitled "Your City—A Book for Mayors," and 827 copies were sent to State boards of health for distribution among city officials.

The book opens with the reasons why it is desirable for city officials to stand for a policy favoring the control of the venereal diseases from the point of view of individual and family welfare and of civic economy. A statement of a program of medical, educational, and legal measures follows. The various aspects of the program are then presented in detail by means of pictures, official pamphlets, model forms, descriptions of available material, illustrations of work accomplished, etc. The book closes with a series of statements by prominent men and women showing an attitude favoring a vigorous policy of control with regard to the venereal diseases on the part of the city administration.

The book was well received. Letters from State health officers and mayors commended it.

Exhibit, District of Columbia.—Of special interest among the projects carried out cooperatively with the State boards of health

was a public exhibit held in Washington last December under the direction of the health department of the District of Columbia.

A large store in the center of the business section of the city was secured for the exhibit. On display were the educational card exhibits for boys, girls, and adults, issued by the Public Health Service. Posters describing the needs of the District of Columbia, including special displays on the work of the local clinic, detention home, and industrial school, were put up. Two projection machines containing lantern slides, one placed in the front window, operated continuously. A set of view boxes showed drawings of the causative organisms of the most prevalent communicable diseases, including gonorrhea and syphilis. The reception room in which this material was on display was entered directly from the street. Books were provided for reading, and a supply of pamphlets for free distribution was placed near the door. Back of the reception room a complete motion-picture equipment was installed, and films were shown each afternoon and evening.

Announcements of the exhibit were given to the press through the health department, and general statements were broadcasted from four local radio stations. Other publicity was given through clubs, churches, and department stores.

The interest and the support of the community in promoting this exhibit was one of its most encouraging features. Prominent women, representatives of local organizations, took charge of the information desk in the reception room and received the visitors. The department stores sent their employees to see the exhibit. The Social Hygiene Society of the District furnished funds, assisted by other local organizations, and the store building, with much of the equipment used, was supplied by the city merchants.

The exhibit was open 20 days. The registered attendance was 20,391. Pamphlets to the number of 31,500 were distributed. It is estimated that 350 film showings were given, with a total attendance of 18,000. Additional, special showings were arranged for police officers, social workers, nurses, and medical students.

Widespread interest in the community and better cooperation with the health department on the part of local organizations resulted from this exhibit. The exhibit itself was widely commended. Although venereal diseases are not notifiable in the District of Columbia, several physicians reported an increased number of patients due to the interest thus aroused. During the first week the health department clinic treated 42 patients, who were referred to it from the exhibit room.

Legislative Measures.

North Dakota, Pennsylvania, West Virginia, and Wisconsin have reported the passage of new laws providing for the control of venereal diseases.

The Legislature of North Dakota passed an act defining carnivals and prohibiting their operation except under certain restrictions. Among the conditions under which such a permit may be issued is that the person securing it shall not knowingly allow or permit to follow or be connected with the carnival any man or woman infected

with venereal disease, and will cooperate with the town or fair board that discovers and apprehends such a man or woman.

New legislation in Pennsylvania makes the practice of prostitution unlawful and prohibits the use of any structure, building, or conveyance for the purpose of prostitution or assignation. The commitment of prostitutes to private institutions is provided for, and their parole under certain conditions authorized.

A law prohibiting the use of a taxicab, jitney bus, or other vehicle as a means or aid in promoting prostitution or illicit sexual intercourse was enacted by the legislature in West Virginia.

Wisconsin's new legislation strengthens the laws for the control of venereal diseases by three enactments. One prohibits working in any place where food is served, prepared, or sold, by any person with a communicable disease or any venereal disease in a communicable form. Another permits qualified officers of the State board of health, in addition to the State and deputy health officers, as specified in the old law, to file complaints against persons with such maladies in order to compel their commitment for treatment. Another new law removes the right of secrecy for physicians' information regarding the presence of venereal diseases and the date when treatment was neglected by the patient, in cases pending before the courts.

Revisions were made in the regulations governing the control of venereal diseases in Illinois and Colorado during the last legislative session.

The division of venereal diseases has received reports of the passage of three city ordinances providing for the control of venereal diseases in Paducah, Ky., and St. Paul and Minneapolis, Minn., respectively. The ordinances passed in the Minnesota cities restricted the operation of carnivals by requiring a license fee of $500 a day for permission to run.

Prosecutions, resulting in two convictions, were made in West Virginia for violations of the interstate quarantine regulations regarding venereal-disease carriers. The California District Court of Appeals, second district, division 1, upheld the detention of persons suspected of being infected with venereal disease. The Supreme Court of Kansas has decided that the venereal-disease ordinance of Wichita authorizes the release of an infected person, not a prostitute, from detention, if, in the judgment of the city physician, the public welfare will not suffer thereby.

From time to time the division has prepared and submitted to State boards of health model forms of laws and ordinances concerned with the control of venereal diseases. During the past five years court decisions and rulings have proved certain portions of these laws to be untenable. For this reason a member of the division is engaged in revising these forms with a view to issuing them so that they will be available to States desiring to use them.

A discussion of the appropriations for venereal-disease control purposes made by the States appears on pages 243–244 of this report.

Statistical Summary.

A summary of the activities in the control of the venereal diseases for the years 1922 and 1923 follows:

Statistical summary of activities in the control of venereal diseases for the fiscal years 1922 and 1923.

	1922	1923
Medical activities.		
A. Cases of venereal diseases reported to State boards of health:		
I. Syphilis	171,824	172,258
II. Gonorrhea	152,959	156,826
III. Chancroid	8,935	7,777
Total	333,718	[1] 338,681
B. Doses of arsphenamin(or similar product)distributed by State boards of health.	517,250	583,772
C. Clinics:		
I. Clinics established during the year	95	33
II. Clinics reporting to State boards of health	541	513
III. Reports from clinics—		
a. Patients admitted	141,279	119,217
b. Patients discharged as noninfectious	60,160	55,503
c. Treatments given	2,045,232	1,992,631
d. Wassermann tests made	298,486	274,957
e. Microscopic examinations for gonococcus infection	192,745	191,132
D. Requests for medical information received by the Public Health Service	1,047	668
Educational activities.		
A. Pamphlets:		
I. Request for pamphlets received by the—		
a. Public Health Service	35,093	14,383
b. State boards of health from—		
1. Public Health Service for compliance	11,175	10,696
2. The public	50,798	41,877
Total	61,973	[2] 52,573
c. Gross total requests for pamphlets received	97,066	66,956
Minus requests received by State boards of health from the Public Health Service	11,175	10,696
d. Net total requests for pamphlets received	85,891	56,260
II. Pamphlets distributed—		
a. By the Public Health Service to—		
1. State boards of health	132,154	25,837
2. Public Health Service field officers	18,500	
3. Others	209,280	105,489
Total	359,934	131,326
b. By State boards of health	[2] 2,093,336	1,568,833
c. Gross total pamphlets distributed	2,453,270	1,700,159
Minus pamphlets distributed by the Public Health Service to—		
1. State boards of health	132,154	25,837
2. Public Health Service field officers	18,500	
d. Net total pamphlets distributed	2,302,616	1,674,322
III. Pamphlets and placards purchased and reprinted by State boards of health	1,698,711	1,513,201
IV. Pieces of the industrial program purchased	40,295	
V. Educational venereal-disease pamphlets issued by the Public Health Service	5	1
VI. Revisions of educational venereal-disease pamphlets issued by the Public Health Service		2
B. Lectures and addresses:		
I. Lectures and addresses reported by the—		
a. Public Health Service	948	945
b. State boards of health	5,983	5,722
Total	6,931	6,667
II. Average attendance reported by the—		
a. Public Health Service	152	213
b. State boards of health	133	107
Average attendance at total lectures reported	135	122

[1] Includes 1,820 cases not classified according to disease.
[2] Includes 22,290 pamphlets distributed in the District of Columbia omitted from the report for 1922.

Statistical summary of activities in the control of venereal diseases for the fiscal years 1922 and 1923—Continued.

	1922	1923
Educational activities—Continued.		
B. Lectures and addresses—Continued.		
III. Lectures at which exhibit material was used reported by—		
a. Public Health Service	76	216
b. State boards of health	588	566
Total	664	782
C. Exhibits and lantern slides:		
I. Exhibits and lantern slide sets loaned by the Public Health Service to—		
a. State boards of health	188	15
b. Public Health Service officers	109	97
c. Others	214	61
Total	511	173
II. Exhibits and slide sets purchased and borrowed by—		
a. State boards of health	770	447
d. Others	1,075	404
Total	1,845	851
III. Exhibit and lantern slide showings reported by the—		
a. Public Health Service		4
b. State boards of health	3,251	1,843
Total	3,251	1,847
IV. Average attendance reported by—		
a. Public Health Service		414
b. State boards of health	264	549
Average attendance at total showings	264	549
D. Motion-picture films:		
I. Motion-picture films loaned by the Public Health Service to—		
a. State boards of health	6	16
b. Public Health Service field officers		27
c. Others	22	16
Total	28	59
II. Motion-picture films purchased and borrowed by State boards of health	45	57
III. Motion-picture showings reported by—		
a. Public Health Service	18	
b. State boards of health	1,188	1,174
Total	1,206	1,174
IV. Average attendance reported by—		
a. Public Health Service	174	
b. State boards of health	218	214
Average attendance at total showings	217	214
E. Publicity material, Public Health Service:		
I. Articles furnished magazines	9	3
II. Periodicals containing articles received	12	
III. Circulation of articles published	126,600	
IV. News sheets furnished journals		3,000
Legislative activities.		
A. States receiving Federal funds	48	46
B. States enacting legislation for venereal disease control purposes	[1] 2	[1] 4
C. City ordinances for venereal disease control passed	6	3

[1] Exlcusive of appropriations made for venereal-disease control purposes.

DIVISION OF PERSONNEL AND ACCOUNTS.

In charge of Asst. Surg. Gen. J. W. Kerr.

There has been little change in the volume of work incident to the handling of commissioned personnel since the transfer of hospitals and dispensaries to the Veterans' Bureau during the latter part of the fiscal year 1922. Under the terms of the Executive order of April 29, 1922, all commissioned personnel engaged in activities relating to the care of ex-service men were detailed for duty to the Veterans' Bureau. In order that proper records might be kept of changes of station, pay, allowances, transportation of dependents, etc., under Public Health Service laws and regulations, it was arranged that changes in assignments of this class of personnel should be made by the Public Health Service, on requests made by the Director of the Veterans' Bureau, and that all accounts involving pay, allowances, traveling expenses, and transportation of dependents should be audited and paid by the Public Health Service from funds allotted by the Veterans' Bureau from its appropriations. The division of personnel and accounts therefore maintains practically the same records in the case of these officers as for commissioned officers of the regular corps and of the reserve who are engaged in Public Health Service work.

The close of the fiscal year marks the first year of operation of the act of June 10, 1922, entitled "An act to readjust the pay and allowances of the commissioned and enlisted personnel of the Army, Navy, Marine Corps, Coast Guard, Coast and Geodetic Survey, and Public Health Service," which became effective on July 1, 1922. Numerous decisions have been rendered by the Comptroller General relating to the provisions of this act, and several changes in pay roll and affidavit forms have been made on instructions from the Comptroller General. While certain of the decisions relative to the provisions of this law do not seem to be in accord with either its purpose or its actual provisions, their finality and the necessity for strict compliance therewith have been accepted. Delays and confusion in making payments under the interpretations given the act have gradually been minimized, with the officer assigned to each.

Another ruling by the Comptroller General, to the effect that employees at field stations can not be promoted to fill vacancies in authorized positions until formal recommendation has been made by the officer in charge, civil service approval secured, and the final approval of the recommendation made by the Secretary of the Treasury, has resulted in delays and complications in the administration of such stations. The unquestioned practice for many years has been that promotions could be made to vacancies caused by the separation of employees holding authorized positions, the promotion being recommended by the officer in charge on or before the date it is desired to become effective, and subsequent approval by the Bureau and by the Secretary of the Treasury validating his action. The necessity of promptly filling such vacancies at hospitals, quarantine, and immigration stations, in epidemic work and in field investigations, would seem to be apparent.

Public Health Districts.

During the fiscal year it was decided to divide the continental United States into seven public health districts and assign an experienced Service officer to act as director in each district, with the object of bringing about closer coordination of the various activities of the Service. At the same time the boundaries of the interstate sanitary districts were changed to coincide with the public health districts. The following shows the location and geographical extent of the districts, with the officer asisgned to each:

Public health district No. 1..... (District of the North Atlantic.)	Comprising the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, and New Jersey. District Director, Surg. A. J. McLaughlin, New York City.
Public health district No. 2..... (District of the Middle Atlantic.)	Comprising the States of Pennsylvania, Delaware, Maryland, West Virginia, Virginia, North Carolina, and South Carolina. District Director, Surg. B. S. Warren, Baltimore, Md.
Public health district No. 3..... (District of the Great Lakes.)	Comprising the States of Ohio, Indiana, Illinois, Wisconsin, Michigan, and Kentucky. District Director, Senior Surg. C. C. Pierce, Chicago, Ill.
Public health district No. 4..... (District of the Gulf.)	Comprising the States of Florida, Georgia, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Arkansas, and Tennessee. District Director, Asst. Surg. Gen. L. L. Williams, New Orleans, La.
Public health district No. 5..... (District of the Missouri.)	Comprising the States of Missouri, Iowa, Minnesota, North Dakota, South Dakota, Nebraska, Kansas, Colorado, and Wyoming. No officer has been assigned as director.
Public health district No. 6..... (District of the North Pacific.)	Comprising the States of Washington, Oregon, Idaho, and Montana. District Director, Senior Surg. G. M. Magruder, Seattle, Wash.
Public health district No. 7..... (District of the South Pacific.)	Comprising the States of California, Nevada, Utah, Arizona, and New Mexico. District Director, Senior Surg. J. C. Perry, San Francisco, Calif.

The duties assigned to the district directors are, in general, to—

(*a*) Make inspections of service stations and activities.
(*b*) Study and report upon standardization of methods and facilities, including personnel.
(*c*) Coordinate service activities by means of conferences with service officers in the district.
(*d*) Investigate and adjust controversies on instructions from the Surgeon General.
(*e*) Serve on boards convened by the Surgeon General.
(*f*) Report on matters affecting service and public health policies.
(*g*) Promote cordial relations with State and local sanitary authorities and other public health organizations.
(*h*) Maintain an office which will serve as a general center for Public Health Service matters.
(*i*) Carry out additional instructions issued from time to time by the bureau.

In the discharge of these functions it was made clear that the work of the directors was to be of an investigational character, and was not to include authority over the internal affairs of stations nor disciplinary powers over their personnel, such matters to be taken up in reports to the Bureau.

Viewed as a whole, the work of the district medical directors has resulted in increasing the efficiency of service operations and in material saving in expenditures. The plan has been found better suited to some districts than others. The activities of these officers necessarily vary in the different districts. In district No. 1 (headquarters New York City) the work has been largely cooperative with State and local authorities and voluntary unofficial health agencies such as the National Health Council, the American Public Health Association, the American Social Hygiene Association, the American Society for the Control of Cancer, the National Child Health Council, the National Committee for Mental Hygiene, the National Organization for Public Health Nursing, and the National Tuberculosis Association. In this district the director was designated as coordinator of supply in line with the general policy of establishing agencies looking to centralization of Government purchases of supplies. His report states that "It is a debatable question whether the service stations in New York gained in quality or reduction in cost by substituting coordinated buying over the old system of station contracts. * * *." The chief defect at that time (in the earlier transactions) was lack of inspection. A system of inspection by representatives of the Bureau of Animal Industry and Bureau of Markets of the United States Department of Agriculture was put into effect. Since that time the system has been generally satisfactory (with certain exceptions).

In district No. 2 very effective work has been done in combining certain service activities, in coordinating others, and in reducing expenditures. Almost all stations, including quarantine stations and relief stations of the first, second, and third classes, were visited. Cordial relations were maintained with State authorities.

The Bureau was obliged to utilize the services of Senior Surgeon Pierce (director of district No. 3) in important investigative work in connection with reported cases of yellow fever in certain Mexican ports, so that this officer was absent from his district a part of the time. Reductions in expenditures and progress in standardization of facilities are reported. Inspections were made of nineteen relief stations. Active cooperation with State and local health authorities and certain voluntary organizations was maintained. There were a number of details for board duty, and the director delivered various addresses before institutions and voluntary agencies on public health topics.

In district No. 4, in addition to visits to marine hospitals and other relief stations, quarantine stations were inspected at the following places, namely: El Paso, Del Rio, Eagle Pass, Laredo, Rio Grande, Hidalgo, Brownsville, Freeport, Galveston, Aransas, and Sabine Pass, Tex.; New Orleans, La.; Gulfport, Miss.; Mobile, Ala.; Biscayne Bay, Boca Grande, Cedar Keys, Key West, Pensacola, St. Johns River, and Tampa Bay, Fla. Satisfactory progress has been made in standardizing proceedings at quarantine stations, but considerable remains to be done in this line along the Texas-Mexican border.

In district No. 6 the relief activities at Astoria, Oreg., were combined with quarantine activities. Inspection of service stations and recommendations in the interest of economy and efficiency were made in a number of instances.

All service stations in district No. 7 were inspected during the year. Careful studies were made of quarantine transactions at San Pedro, Calif., and a report made to the Surgeon General. A plan for giving instructions in first aid to masters and pilots was formulated to the satisfaction of the nautical school at that place. Observations have been made of the medical inspection of immigrants at stations in California, Arizona, and New Mexico, adjustment of salaries of officers made and coordination of work effected. Studies have been made of sanitary conditions in two national parks in this district, with report. The central office has answered many inquiries on public health subjects and active cooperation with State and local health authorities has been maintained.

Reclassification of Personnel.

During the latter part of the fiscal year much work has been done, at the request of the personnel classification board, toward securing data desired by the board in its survey of all field services, as required by the classification act of 1923. The importance of this work to all Federal employees is recognized, and every effort has been put forth to secure as completely as possible the information desired by the board.

Commissioned Medical Officers.

On July 1, 1922, the regular corps consisted of the Surgeon General, 4 assistant surgeons general at large, 20 senior surgeons, 103 surgeons, 52 passed assistant surgeons, and 20 assistant surgeons. Of this number, aggregating 200, 1 assistant surgeon general at large, 9 senior surgeons, 4 surgeons, and 3 passed assistant surgeons were carried on waiting orders. During the fiscal year the following changes occurred in the several grades: 18 passed assistant surgeons were promoted to the grade of surgeon, one of them taking rank from a date prior to July 1, 1922; 3 assistant surgeons were promoted to the grade of passed assistant surgeon; 7 candidates for appointment to the grade of assistant surgeon were successful in the entrance examination prescribed by laws and regulations of the Service, and were commissioned in that grade; 1 assistant surgeon general at large was placed on waiting orders because of physical disability. Two surgeons, two passed assistant surgeons, and one assistant surgeon resigned from the Service. The commission of one passed assistant surgeon was terminated by the President because of the officer's failure to submit his resignation as required by paragraph 69 of the Service regulations.

On June 30, 1923, after these changes had occurred the regular commissioned corps consisted of the Surgeon General, 4 assistant surgeons general at large, 20 senior surgeons, 119 surgeons, 34 passed assistant surgeons, and 23 assistant surgeons. Of these 201 officers, 2 assistant surgeons general at large, 9 senior surgeons, 4 surgeons, and 3 passed assistant surgeons were on that date on waiting orders. The total number is 17 less than in 1918, the difference being due to lack of successful candidates to fill these vacancies.

At the close of the fiscal year 1923 seven surgeons were serving by detail as assistant surgeons general in charge of the divisions of the bureau in accordance with the acts approved July 1, 1902, and July

9, 1918. One assistant surgeon general at large, three senior surgeons, and two surgeons were on duty as directors of the public health districts. One assistant surgeon general at large continued in general charge of the enforcement in Europe of outgoing quarantine measures applicable to vessels, their crews, and emigrants destined to ports in the United States and its dependencies. One assistant surgeon general was acting, when necessary, in the capacity of assistant to the director of the International Sanitary Bureau, Washington, D. C. One surgeon was on detail as chief surgeon, Bureau of Mines, Department of the Interior, and two passed assistant surgeons were serving, one as medical director, on detail to the United States Employees Compensation Commission.

Reserve Officers.

On July 1, 1922, the reserve commissioned officers on active duty numbered 987. At that time 16 senior surgeons, 322 surgeons, 408 passed assistant surgeons, 138 assistant surgeons were detailed to the United States Veterans' Bureau; and 1 assistant surgeon general, 2 senior surgeons, 15 surgeons, 50 passed assistant surgeons, and 35 assistant surgeons were on duty with the Public Health Service.

During the fiscal year 1923 there were 26 officers placed on active duty, 43 promotions, 1 demotion, 7 deaths, 32 resignations, 2 dismissals from the service, 22 commissions of officers on active duty terminated, and 111 officers placed on inactive status. The commissions of 260 officers on the inactive list were terminated in order to keep the distribution of commissions in the several grades within the limit required by the joint resolution of October 27, 1918, establishing the reserve. As a result of these changes there was a decrease of 104 officers in the Veterans' Bureau detail and 44 officers on duty with the Public Health Service.

On June 30, 1923, after these changes had occurred, the corps numbered 839 officers, of which 1 assistant surgeon general, 36 senior surgeons, 285 surgeons, 10 dental surgeons, 317 passed assistant surgeons, 29 passed assistant dental surgeons, 88 assistant surgeons, and 14 assistant dental surgeons were on duty with the Veterans' Bureau, while 1 assistant surgeon general, 3 senior surgeons, 1 senior dental surgeon, 8 surgeons, 1 dental surgeon, 22 passed assistant surgeons, 7 passed assistant dental surgeons, 14 assistant surgeons, and 2 assistant dental surgeons were serving with the Public Health Service. Six assistant surgeons general, 19 senior surgeons, 75 surgeons, 66 passed assistant surgeons, and 131 assistant surgeons were on the inactive list at the close of the fiscal year.

The detail of reserve medical officers to the Veterans' Bureau for duty is provided for in the act approved August 9, 1921. These officers retain their status as commissioned officers of the Public Health Service, and their transfers from station to station, assignments to new duties, promotions, reductions, and separations are effected by the Public Health Service at the request of the director of the Veterans' Bureau.

Attending Specialists.

The number of attending specialists on duty June 30, 1923, was 112. Of these part-time physicians, 88 were engaged as consultants to marine hospitals, while the services of 14 were available for use in connection with the operation of second and third class relief stations.

Numerous readjustments of compensation paid to attending specialists were made during the fiscal year, A large number of these locally employed physicians, who are eminent in their respective specialties, agreed to accept nominal compensation of $1 per annum. Others were placed on a fee basis, to receive fixed fees for consultations, examinations, treatments, and both major and minor operations. Very few appointments to positions carrying annual salaries other than $1 per annum were made during the period under review. As a result, notwithstanding an increase of 40 in the number of attending specialists employed, it has been possible to appreciably reduce the total pay roll for the valuable service rendered by physicians of this class.

At the close of the fiscal year 37 attending specialists were receiving nominal compensation of $1 per annum, and 28 were on a fee basis. Although 47 others were carried on an annual salary basis, the compensation paid in many cases was practically nominal and was not commensurate with the amount or nature of the work performed. It must be appreciated that much of the service rendered is given from a desire to assist the service in improving the care extended to beneficiaries of the Government.

Acting Assistant Surgeons.

On July 1, 1922, there were 445 acting assistant surgeons on duty in the Public Health Service, and by June 30, 1923, this number had increased by 12.

Of the 457 acting assistant surgeons on duty June 30, 1923, 95 were on duty at marine hospitals, 284 were engaged in immigration, relief, and national and foreign quarantine work, 4 were engaged in the prevention of trachoma, 20 were on duty in connection with field investigations of public health and rural sanitation, 1 was engaged in national-park sanitation, 8 were detailed to the United States Coast Guard for duty, 5 were detailed to other bureaus of the Federal Government, and 40 were engaged in antivenereal disease activities as part-time employees at nominal compensation. Thirteen acting assistant dental surgeons were included in the 457 on duty at the close of the fiscal year.

Internes.

On July 1, 1922, there were 20 internes in the service, and on June 30, 1923, there were 19, one of whom was a student. Internes are locally appointed for temporary periods of one year for duty at marine hospitals. Twenty-three vacancies existed in positions of this class at the end of the fiscal year.

Collaborating Epidemiologists.

The appointment of collaborating epidemiologists and assistant collaborating epidemiologists has been slightly extended during the year. These employees are nearly all health officers or employees of State or local boards of health, who furnish the Service with reports of communicable diseases as soon as received by State or local health organizations. In most cases their compensation is $1 per annum. During the year the number of collaborating epidemiologists was not increased, 40 being on duty in different States, but the assistant collaborating epidemiologists were increased from 4,125 to 4,216.

Hygienic Laboratory.

At the close of the fiscal year the personnel of the Hygienic Laboratory included, in addition to the director and assistant director, 3 chiefs of divisions, 5 surgeons, 3 passed assistant surgeons, 2 pharmacists, 3 technical assistants, 4 special experts, 2 pharmacologists, 1 assistant pharmacologist, 2 junior pharmacologists, 5 chemists, 3 assistant chemists, 1 junior chemist, 4 bacteriologists, 2 assistant bacteriologists, 2 junior bacteriologists, 1 bacteriological technician, 1 artist, 21 other technical employees, and 56 attendants and other employees.

Pharmacists and Administrative Assistants.

At the close of the fiscal year 38 pharmacists and 20 administrative assistants were on duty. The slight decrease in the number of administrative assistants over the preceding fiscal year is accounted for by resignations and discontinuances because of reduction of personnel at certain stations. The two members of the pharmacist corps who were detailed as associate medical purveyors have reverted to their status as pharmacists of the first class.

At the close of the fiscal year pharmacists and administrative assistants were classed as follows:

Pharmacists, first class	32
Pharmacists, second class	6
Administrative assistants, first class	5
Administrative assistants, second class	6
Administrative assistants, third class	7
Administrative assistants, fourth class	2

Boards Convened.

Fifty-three boards were convened at various stations throughout the United States for the physical examination of officers of the Coast Guard and applicants for entrance therein; 6 for the physical examination of detained aliens; 7 for the examination of commissioned officers to determine their fitness for promotion to the next higher grades of the Service; 7 for examination of applicants for appointment as assistant surgeons; 1 to consider alleged shortage of Government property at a Service hospital; 24 for the physical examination of commissioned officers, United States Coast Guard, for promotion; 2 for physical examination of Coast Guard employees for

retirement; 4 for the examination of sanitary engineers for promotion; 1 for examination of a pharmacist to determine eligibility for promotion; 1 for survey of property at Polyclinic Hospital, New York, to determine damages done by Government during occupancy of same; 1 to consider methods relative to quarantine and immigration procedure; 1 for examination of applicant for renewal of master's license at San Francisco; 1 to consider practicability of utilizing one of buildings on marine hospital reservation for Service laboratory; 1 to consider revision of the system of nomenclature used by the Service; 1 to consider evidence submitted by United States Employees Compensation Commission in case of injured Federal employee.

Personnel Statement.

Accompanying is a statement showing the total personnel of the Service, by designation and activity, on June 30, 1923.

	Medical and scientific.																
	Regular corps.							Reserve corps.									
	Surgeon General.	Assistant Surgeon General at large.	Assistant Surgeon General.	Senior surgeon.	Surgeon.	Passed Assistant surgeon.	Assistant surgeon.	Assistant Surgeon General.	Senior surgeon.	Surgeon.	Passed Assistant surgeon.	Assistant surgeon.	Acting Assistant Surgeon.	Attending specialist.	Interne.	Scientific personnel.	Assistant collaborating epidemiologist.
BUREAU.																	
Surgeon General's Office	1				1												
Chief clerk's office																	
Divisions			7		3					1							
General inspection service								1	1								
Detailed to other offices					1	2											
Total																	
FIELD.																	
Coast Guard					1						3	2	8				
General inspection service									2								
Perryville Supply Depot																	
Detailed to Veterans' Bureau								1	36	295	346	102					
Waiting orders		2		9	4	3											
Hospital division:																	
Marine Hospital No. 1, Baltimore, Md					2						1		8	10	2		
Marine Hospital No. 2, Boston, Mass				1							3		2	10	2		
Marine Hospital No. 3, Buffalo, N. Y					1						2		3	6	2		
Marine Hospital No. 5, Chicago, Ill					2		1				1	1	6	6	2		
Marine Hospital No. 6, Cleveland, Ohio					1						1		3	6	2		
Marine Hospital No. 7, Detroit, Mich					1								5	4	2		
Marine Hospital No. 8, Evansville, Ind					1								1	2			
Marine Hospital No. 9, Fort Stanton, N. Mex					1	1					2		3				
Marine Hospital No. 10, Key West, Fla					1									2			
Marine Hospital No. 11, Louisville, Ky					1					1			2	5	1		
Marine Hospital No. 12, Memphis, Tenn					1								1				
Marine Hospital No. 13, Mobile, Ala					1		1						3	3	1		
Marine Hospital No. 14, New Orleans, La					1						1	1	8	4	4		
Marine Hospital No. 15, Pittsburgh, Pa				1								1	2				
Marine Hospital No. 16, Portland, Me					1								2	9	1		
Marine Hospital No. 17, Port Townsend, Wash					1						1		4		1		
Marine Hospital No. 18, St. Louis, Mo					1						1		3	12	2		
Marine Hospital No. 19, San Francisco, Calif				1			1		1	1	2	3	5	1	3		

Marine Hospital No. 20, Savannah, Ga					1								6	2			
Marine Hospital No. 21, Stapleton, N. Y					2		2			1	1		8	1	4		
Marine Hospital No. 22, Vineyard Haven, Mass														1			
Marine Hospital No. 43, Ellis Island, N. Y					2	4	1						5	1	6		
Marine Hospital No. 66, Carville, La										1			3	2	2		
Marine Hospital No. 70, Hudson Street, New York				1	2	1					4	3	13	8	2		
Marine Hospital No. 82, Tanners Creek, Va				1	2					1	3	2	2	3	2		
Total hospitals																	
Relief stations:																	
Second class				2	3						3	3	17	12			
Third class													94	2			
Foreign quarantine division:																	
Baltimore, Md													2				
Boston, Mass					2		1						7				
Ellis Island, N. Y. (immigration)					10	3	2						17				
El Paso, Tex						1							1				
Galveston, Tex				1									2				
Hampton Roads, Va					1								1				
Laredo, Tex													2				
Marcus Hook, Pa					1								1				
New Orleans, La							1						3				
Rosebank, N. Y					3	1	2						12				
San Francisco, Calif. (quarantine and immigration)					2		4						1				
San Juan, P. R					1								2				
Foreign ports		1			5	1				2			36				
All others					13	2	4						91				
Domestic quarantine division:																	
New Orleans, La					1												
San Francisco, Calif					1												
Interstate																10	
Trachoma						1							4				
Rural sanitation					3	2							6				
All others					1								1			1	
Scientific research division:																	
Hygienic Laboratory					6	6	1										
Leprosy investigation					1	1											
Malaria					2		1						2			9	
Pellagra					2												
Stream pollution					1	1										6	
Industrial hygiene and sanitation					3	1	1						9			2	
Child hygiene					3								4				
Morbidity statistics																2	
All others					6	2							1				
Sanitary Reports and Statistics Division																	4,216
Venereal diseases division													40	6			
Miscellaneous		1		3	4	1											
Total	1	4	7	20	111	34	23	2	40	303	375	118	462	118	41	30	4,216

Personnel of the Public Health Service, June 30, 1923—Continued.

	General and technical.													Total.			
	Collaborating epidemiologist.	Pharmacist.	Administrative assistant.	Druggist.	Nurse.	Aid.	Dietitian.	Laboratorian, roentgenology.	Laboratorian, bacteriology.	Pilot.	Marine engineer.	Clerk.	All other.	Medical and scientific.	General and technical.	Subtotal.	Grand total.
BUREAU.																	
Surgeon General's Office												5	2	2	7	9	
Chief clerk's office												31	29		60	60	
Divisions		1			3							159	6	11	169	180	
General Inspection Service												4		2	4	6	
Detailed to other offices		1	1	1								32	6	3	41	44	
Total														18	281		299
FIELD.																	
Coast Guard														14			14
General Inspection Service												3	1	2	4		6
Perryville Supply Depot		1										4	40		45		45
Detailed to Veterans' Bureau														780			780
Waiting orders														18			18
Hospital division:																	
Marine Hospital No. 1, Baltimore, Md		1	1		14	1	2	1	1			10	54	23	85	108	
Marine Hospital No. 2, Boston, Mass		1	1		10	2	1	1	1			5	57	18	79	97	
Marine Hospital No. 3, Buffalo, N. Y		1			10	2	1					5	18	14	37	51	
Marine Hospital No. 5, Chicago, Ill		1		1	17	2	2	1	2			9	50	19	85	104	
Marine Hospital No. 6, Cleveland, Ohio		1		1	11	1	1		1			5	24	13	45	58	
Marine Hospital No. 7, Detroit, Mich		1			11	3						4	32	12	51	63	
Marine Hospital No. 8, Evansville, Ind		1			5							2	15	4	23	27	
Marine Hospital No. 9, Fort Stanton, N. Mex				1	13	2	1	1	1			14	111	7	144	151	
Marine Hospital No. 10, Key West, Fla		1			4			1				1	10	3	17	20	
Marine Hospital No. 11, Louisville, Ky		1			6	1	1		1			4	18	10	32	42	
Marine Hospital No. 12, Memphis, Tenn				1	3		1					2	14	2	21	23	
Marine Hospital No. 13, Mobile, Ala		1			8							3	34	9	46	55	
Marine Hospital No. 14, New Orleans, La		1	2	1	21	3	2	1	1			11	89	19	132	151	
Marine Hospital No. 15, Pittsburgh, Pa			1		7	2	1					4	18	4	33	37	
Marine Hospital No. 16, Portland, Me					3		1					2	16	13	22	35	

Marine Hospital No. 17, Port Townsend, Wash.		1		1	10	1	1					2	25	7	41	48	
Marine Hospital No. 18, St. Louis, Mo.		1			7		1					5	36	19	50	69	
Marine Hospital No. 19, San Francisco, Calif.		2		1	32	6	2	1	1			6	84	18	135	153	
Marine Hospital No. 20, Savannah, Ga.		1	1		8		1					4	22	9	37	46	
Marine Hospital No. 21, Stapleton, N. Y.		2		1	28	3	2	1	1			12	115	19	165	184	
Marine Hospital No. 22, Vineyard Haven, Mass.					3		1					1	7	1	12	13	
Marine Hospital No. 43, Ellis Island, N. Y.			2	1	48	4	4					11	177	19	247	266	
Marine Hospital No. 66, Carville, La.			2		1							5	208	8	216	224	
Marine Hospital No. 70, Hudson Street, New York		1	2	1	14	6	1	1	3			17	53	34	99	133	
Marine Hospital No. 82, Tanners Creek, Va.		1	1	1	15	3	1	1	1			11	78	16	113	129	
Total hospitals														320	1,967		2,287
Relief stations:																	
Second class		4	1	1	4	1			1			18	10	40	40	80	
Third class		1										13	2	96	16	112	
Total														136	56		192
Foreign quarantine division:																	
Baltimore, Md.			1							1	1		15	2	18	20	
Boston, Mass.		1			3					3	3	1	19	10	30	40	
Ellis Island, N. Y. (immigration)												5	16	32	21	53	
El Paso, Tex.												1	13	2	14	16	
Galveston, Tex.			1							2	2	1	12	3	18	21	
Hampton Roads, Va.		1								2	3	1	29	2	36	38	
Laredo, Tex.													13	2	13	15	
Marcus Hook, Pa.					2					2	2		12	2	18	20	
New Orleans, La.			1							1	1		26	4	29	33	
Rosebank, N. Y.		2			5					5	5	11	138	18	166	184	
San Francisco, Calif. (quarantine and immigration)					2					2	1	4	44	7	53	60	
San Juan, P. R.											1	2	23	3	26	29	
Foreign ports					1							5	7	45	13	58	
All others			2		3					13	11	12	188	110	229	339	
Total														242	684		926
Domestic quarantine division:																	
Texas-Mexican border													11		11	11	
New Orleans, La.													27	1	27	28	
San Francisco, Calif.													24	1	24	25	
Interstate												3	30	10	33	43	
Trachoma		1			10							1	12	5	24	29	
Rural sanitation					5							1	61	11	67	78	
All others														3		3	
Total														31	186		217

Personnel of the Public Health Service, June 30, 1923—Continued.

	General and technical.													Total.			
	Collaborating epidemiologist.	Pharmacist.	Administrative assistant	Druggist.	Nurse.	Aid.	Dietitian.	Laboratorian, roentgenology.	Laboratorian, bacteriology.	Pilot.	Marine engineer.	Clerk.	All other.	Medical and scientific.	General and technical.	Subtotal.	Grand total.
FIELD—continued.																	
Scientific research division:																	
Hygienic Laboratory		2										12	92	13	106	119	
Leprosy investigation												1	6	2	7	9	
Malaria		1										2	11	14	14	28	
Pellagra												4	4	2	8	10	
Stream pollution		1										3	13	8	17	25	
Sewage disposal													8		8	8	
Industrial hygiene and sanitation		1			4							9	8	16	22	38	
Child hygiene					4							5	4	7	13	20	
Morbidity statistics					2							8	6	2	16	18	
All others												3	15	9	18	27	
Total														73	229		302
Sanitary reports and statistics division	40													4,216	40		4,256
Venereal diseases division													20	46	20		66
Miscellaneous												3		9	3		12
Total	40	38	20	13	357	43	28	10	15	31	30	522	2,368	5,905	3,515		9,420

Financial Statement.

By methods heretofore established, the apportionments, allotments, encumbrances, and expenditures of appropriations have been continued. In consequence accurate records of finances have been maintained.

Special efforts have been made to improve these methods in respect to the reporting of all encumbrances against appropriations, in order to be in position to report promptly after the end of each month the state of the appropriations.

The total number of these appropriation items is 17, including the allotment from the Veterans' Bureau.

A detailed financial report appears as an appendix to this report.

GENERAL INSPECTION SERVICE.

On May 1, 1922, the United States Veterans' hospitals were transferred from the jurisdiction of the Public Health Service to the Veterans' Bureau. With this transfer, a number of officers of the general inspection service were detailed to the Veterans' Bureau, and, owing to the diminution of the work brought about by this separation of the Veterans' hospitals from the Public Health Service, the general inspection service was reorganized to meet the situation.

On July 1, 1922, the following stations were under inspection by the general inspection service:

United States marine hospitals	27
United States Public Health Service relief stations, second, third, and fourth class	102
Hospitals under contract with the United States Public Health Service (in connection with relief stations)	105

Inspections and investigations were made as follows:

Special investigations	25
Inspections:	
United States marine hospitals	60
Relief stations	101
Contract hospitals	110
Property condemnations	62
Charges and specifications prepared	6

On July 1, 1922, the general inspection service was operating four field offices, with a personnel of one commissioned officer each. The central office at the bureau, Washington, D. C., had three commissioned officers.

Dating from August 14, 1922, the western general inspection area was closed, the officer in charge being transferred to the Veterans' Bureau for duty, and the inspections in that area were undertaken by the general inspector in charge of the central general inspection area in addition to his duties in the central general inspection area.

The following table shows the number of hospitals and stations subject to inspection, the number of inspections, and the percentage of inspections:

Stations.	Number subject to inspection.	Number of inspections made.	Percentage of inspections.
United States marine hospitals	27	60	222.2
Relief stations, second, third, and fourth class	102	102	100.0
Contract hospitals	105	110	100.4

The following table indicates the number of officers on duty during the various months of the year, the stations visited, and the mileage traveled:

Date.	Number of officers.	Stations visited.	Mileage.
1922.			
July	6	21	6,339
August	5	16	6,422
September	5	22	6,275
October	5	18	7,343
November	5	19	6,602
December	5	22	10,542
1923.			
January	5	47	7,896
February	5	18	5,896
March	5	31	7,902
April	5	25	1,803
May	5	42	7,090
June	5	30	2,464
Total		311	76,574

Since the transfer of the hospitals to the Veterans' Bureau, there has been a more than proportionate diminution in the number of complaints and other situations demanding special investigations. On the other hand, the special investigations that were undertaken during the past fiscal year were much more difficult, and involved subjects of more importance, than those which have heretofore been handled by the general inspection service, and required, on an average, a considerably larger amount of work and time than did those that were conducted in previous years.

CHIEF CLERK'S OFFICE.

Force on Duty in the Bureau.

During the fiscal year the number of employees in the bureau increased from 223 to 279. A large portion of this increase was due to the transfer to the departmental service of 30 employees from the headquarters office of the purveying service, which was abolished as a field station on account of the establishment of the Bureau of Supply of the Treasury Department, to which was detailed all personnel engaged in supply work, effective July 1, 1922.

Buildings and Office Quarters.

During the year the bureau was able, through consolidation and rearrangement, to reduce somewhat the size of its office quarters. At present it occupies approximately one wing of temporary building C, one-third of a wing of temporary building F, and a portion of the Butler Building.

Public Health Service Library.

The bureau library added 345 bound volumes and approximately 300 pamphlets to its collection during the year. This increase was mainly accomplished through gifts and exchange, as the appropriation of $500 was largely used in securing necessary scientific journals, and but little was available for book purchases. The library at present contains a total of 9,586 volumes and 3,800 pamphlets. The medical and scientific journals received regularly numbered 102, of which 40 were paid subscriptions, the remainder being obtained gratuitously or through exchange.

The practical usefulness of the library facilities were considerably enlarged through cooperation with the Library of the Surgeon General of the Army, the Library of Congress, and other libraries.

A system is in use whereby books may be loaned to officers of the service located in any part of the United States.

General Files System.

Further progress has been made in improving the files and establishing a modern system for the use of the bureau.

RECOMMENDATIONS.

Public Health Work in Cooperation with States.

It is recommended that studies of and demonstrations in rural sanitation be superseded by a plan of work to be conducted with the States on a cooperative basis. A national public-health program which will enable the Federal Government to work out with each of the States the best methods for meeting the problems of that particular State and then to assist in putting them into effect has been demonstrated to be feasible and practicable. If all of the separate appropriations for various lines of cooperative health work with States were combined and administered in accordance with such a plan the cause of public health would be immeasurably advanced and much needless overhead eliminated.

Extension of Research.

It is urged that the value of the research work of the Public Health Service should receive continued and increasing recognition, and that the means should be provided for its adequate prosecution. This recommendation is made in the belief that this work constitutes a valuable service to the public which, as regards a certain range of selected problems, can not satisfactorily be performed by any but a Government agency.

National Quarantine Service.

Attention is again invited to the fact that should several large vessels need to be detained in quarantine during the year, the appropriations which have been submitted for this service will be inadequate and there will probably be a necessity for a deficit.

Additional Hospital Facilities.

To meet the growing demands for medical care of American seamen, a marine hospital is needed at Seattle, Wash., and another in southeastern Texas. The hospital at Detroit, Michigan, is located in a congested manufacturing district, unsuitable by reason of noise and dirt for hospital purposes, and should be sold and a modern hospital built on a new site. Extensive additions are needed to enlarge the capacity of the hospitals at Stapleton, N. Y., and certain other ports. Replacements of dilapidated buildings, some of them unfit for hospital purposes, are urgently needed in San Francisco, Calif., Fort Stanton, N. Mex., New Orleans, La., and Baltimore, Md. Housing facilities for female nurses and other personnel are needed at various places, and particularly in Buffalo, N. Y., Key West, Fla., Chicago, Ill., and Fort Stanton, N. Mex.

The physical condition of many of the marine hospitals is unsatisfactory, adequate funds having been lacking for several years to

make proper repairs. The general appearance of these buildings and grounds is not a credit to the Government and evokes criticism. Moreover, this condition often reflects itself in decreased hospital efficiency. Considerable appropriations are needed to supplement the inadequate annual appropriations now provided for the use of the Supervising Architect for hospital repairs.

Public Health Education.

In view of the constantly increasing demands for publications of the service and the necessity for a larger circulation of some of these publications to supply these demands, and in view of the necessity for the education of the public, it is recommended that appropriate legislation be enacted providing for larger editions of the publications of the service. At the present time the limitations imposed by law upon the editions of Government publications has greatly crippled the service in its work of disseminating the educational matter compiled by its officers.

Venereal Disease Control Activities.

It is earnestly recommended that appropriations for this important public-health activity be made as recommended in the estimates submitted for the current budget.

Personnel.

On account of the higher standards of medical education and the consequent smaller number of graduates in recent years, increasing difficulty has been experienced in securing additions to the corps of commissioned medical officers. Under present law these officers are required to serve four years as assistant surgeons. It is recommended that the period of service in the grade of assistant surgeon be three years.

By reason of the increased activities connected with the medical examination and treatment of civil service employees injured in line of duty, the modifications of the movements of arriving aliens under the recent immigration act, and the consequent greater need of thoroughly qualified medical officers, it is recommended that the appropriations providing for additional assistant surgeons be increased.

In view of the continued necessity for the utilization of the services of commissioned medical officers in the Reserve Corps of the service, it is recommended that a limited number of these officers be regularly commissioned, after satisfactorily passing examinations under regulations prescribed by the President. The act granting this authority should provide also for sanitary engineers and other scientific workers. This provision would stabilize the Federal Public Health personnel and, by reason of greater mobility, increase its efficiency.

H. S. Cumming,
Surgeon General.

To the honorable A. W. Mellon,
Secretary of the Treasury.

APPENDIX.

Financial Statement.

The following is a statement of expenditures from appropriations for the Public Health Service for the fiscal year 1923:

Receipts and Expenditures, Public Health Service, for the fiscal year ending June 30, 1923.

APPROPRIATION: "PUBLIC HEALTH SERVICE, 1923."

Subheads of appropriations.	Appropriations.	Expenditures and encumbrances.	Budget saving.	Balance June 30, 1923.
Pay, etc., commissioned officers and pharmacists	$1,087,833.84	$1,070,628.45	$15,000.00	$2,205.39
Pay of acting assistant surgeons	300,000.00	290,000.00	10,000.00	
Pay of other employees	840,000.00	833,325.08		6,674.92
Freight, transportation, etc	50,000.00	50,000.00		
Maintenance, Hygienic Laboratory	45,000.00	44,483.37		516.63
Books	500.00	500.00		
Disbursements as of June 30, 1923		2,091,113.72		
Encumbrances as of June 30, 1923		197,823.18		
Total	2,323,333.84	2,288,936.90	25,000.00	34,396.94

APPROPRIATION: "QUARANTINE SERVICE, 1923."

Amount of appropriation		$739,000.00
Expenditures:		
Disbursements	$453,552.64	
Encumbrances	125,461.01	
		579,013.65
Balance June 30, 1923		159,986.35
Budget saving		150,000.00

Expenditures by stations.

Name of station.	Pay and allowances, officers and employees.	Maintenance.	Total maintenance, pay, and allowances.
Baltimore, Md	$31,361.64	$22,603.79	$53,965.43
Beaufort, S. C	736.25	288.02	1,024.27
Biscayne Bay, Fla		109.50	109.50
Boca Grande, Fla	1,568.00	3,767.51	5,335.51
Boston, Mass	43,013.83	37,567.77	80,581.60
Brownsville, Tex	4,880.00	764.21	5,644.21
Brunswick, Ga	4,351.33	3,226.97	7,578.30
Cape Charles, Va	44,224.78	38,427.03	82,651.81
Cape Fear, N. C	7,372.00	5,743.23	13,115.23
Cedar Keys, Fla	300.00		300.00
Charleston, S. C	14,223.67	6,726.21	20,949.88
Columbia River, Oreg	13,974.83	9,158.19	23,133.02
Cumberland Sound, Fla	3,180.00	77.04	3,257.04
Delaware Bay and River	2,831.65	3,803.10	6,634.75
Delaware Breakwater, Del	2,400.00	1,150.67	3,550.67
Eagle Pass, Tex	13,283.50	999.59	14,283.09
El Paso, Tex	24,597.14	5,808.06	30,405.20
Eureka, Calif		41.00	41.00
Galveston, Tex	24,341.88	12,409.47	36,751.35
Georgetown, S. C	60.00	6.00	66.00
Gulfport, Miss	5,760.00	1,113.77	6,873.77
Honolulu, Hawaii (including subports)	22,798.38	8,961.15	31,759.53
Key West, Fla	8,904.79	487.61	9,392.40
Laredo, Tex	16,273.41	3,372.42	19,645.83
Leprosy-investigation station		2,145.19	2,145.19
Marcus Hook, Pa	25,265.00	30,859.39	56,124.39
Miscellaneous	15,248.33	12,199.91	27,448.24
Mobile, Ala	13,520.01	9,181.90	22,701.91
New Orleans, La	31,929.85	14,970.36	46,900.21
Pascagoula, Miss	647.50		647.50
Pensacola, Fla	9,305.00	7,191.06	16,496.06

Expenditures by stations—Continued.

Name of station.	Pay and allowances, officers and employees.	Maintenance.	Total maintenance, pay, and allowances.
Perth Amboy, N. J.	$1,250.00	$1,200.00	$2,450.00
Port Arthur, Tex.	5,645.49	2,251.82	7,897.31
Port Aransas, Tex.	4,800.00		4,800.00
Portland, Me.	11,992.09	13,833.96	25,826.05
Port Angeles, Wash.		178.45	178.45
Port Townsend, Wash.	18,551.98	6,010.55	24,562.53
Providence, R. I.	10,645.00	3,027.10	13,672.10
New York, N. Y.	227,675.10	202,616.83	430,291.93
Reedy Island, Del.	7,077.46	554.14	7,631.60
San Juan, P. R. (includes subports)	20,549.58	12,155.06	32,704.64
Sabine, Tex.	15,890.51	7,553.88	23,444.39
San Diego, Calif.	10,257.00	4,659.49	14,916.49
San Francisco, Calif. (including subports)	48,646.96	50,131.23	98,778.19
San Pedro, Calif.	4,951.71	3,963.88	8,915.59
St. Andrews, Fla.		523.04	523.04
St. Georges Sound, Fla.		138.00	138.00
St. Josephs, Fla.		250.00	250.00
St. Johns River, Fla.	975.00	789.78	1,764.78
St. Thomas, Virgin Islands	11,431.90	1,428.14	12,860.04
Savannah, Ga.	11,722.00	7,468.46	19,190.46
Tampa Bay, Fla.	7,392.26	5,733.91	13,126.17
Total	805,806.81	567,627.84	1,373,434.65

APPROPRIATION: "PREVENTING THE SPREAD OF EPIDEMIC DISEASES, 1923."

Amount of appropriation		$400,000.00
Expenditures:		
Disbursements	$299,761.37	
Encumbrances	41,226.34	
		340,987.71
Total balance		59,012.29
Budget saving		50,000.00
Expenditures:		
Plague eradicative measures—		
Louisiana		35,996.66
Texas		7,229.30
Florida		3,120.00
California		31,016.30
Washington		3,360.00
New England and miscellaneous		19,279.52
Prevention of trachoma—		
Kentucky		36,549.34
Tennessee		11,404.31
North Dakota		4,766.28
Georgia		2,252.82
Missouri		1,414.82
Arkansas		11,965.07
Preventive measures—		
Baltimore and miscellaneous stations		850.00
Cuba, South America, and Mexico		29,799.69
France		11,343.41
England, Belgium, Holland, Sweden		15,354.57
Greece		2,800.00
China		4,531.67
Italy, Spain		12,455.97
Rosebank, N. Y.		584.00
Travel, telegrams, etc.		13,246.99
Miscellaneous quarantine stations		6,635.81
Bureau, hospitals, districts		3,630.42
Field investigation stations, spotted fever, Hamilton, Mont.		23,912.57
Porto Rico		1,920.00
Germany		7,963.18
Denmark		1,276.66
Norway		1,325.27
Turkey		1,800.00
Russia		1,249.99
Total		309,034.62

APPROPRIATION: "FIELD INVESTIGATIONS OF PUBLIC HEALTH, 1923."

Amount of appropriation		$300,000.00
Expenditures:		
Disbursements	$251,060.19	
Encumbrances	40,003.86	
		291,064.05
Balance, June 30, 1923		8,935.95

APPROPRIATION: "INTERSTATE QUARANTINE SERVICE, 1923."

Amount of appropriation		$25,000.00
Expenditures:		
Disbursements	$19,786.64	
Encumbrances	5,213.36	
		25,000.00
Balance, June 30, 1923		None.

APPROPRIATION: "STUDIES OF RURAL SANITATION, PUBLIC HEALTH SERVICE, 1923."

Amount of appropriation		$50,000.00
Expenditures:		
Disbursements	$36,582.29	
Encumbrances	13,417.71	
		50,000.00
Balance, June 30, 1923		None.

APPROPRIATION: "CONTROL OF BIOLOGIC PRODUCTS, PUBLIC HEALTH SERVICE, 1923."

Amount of appropriation		$50,000.00
Expenditures:		
Disbursements	$29,502.01	
Encumbrances	20,248.35	
		49,750.36
Balance, June 30, 1923		249.64

APPROPRIATION: "SALARIES OFFICE OF THE SURGEON GENERAL, PUBLIC HEALTH SERVICE, 1923."

Amount of appropriation		$92,970.00
Expenditures		92,970.00
Balance		None.

APPROPRIATION: "PREPARATION AND TRANSPORTATION OF REMAINS OF OFFICERS, PUBLIC HEALTH SERVICE, 1923."

Amount of appropriation		$3,000.00
Expenditures		1,841.42
Balance, June 30, 1923		1,158.58
Budget saving		1,000.00

APPROPRIATION: "MEDICAL AND HOSPITAL SERVICES, PUBLIC HEALTH SERVICE, 1923."

Amount of appropriation		$4,682,284.00
Expenditures:		
Disbursements	$3,838,350.03	
Encumbrances	516,590.27	
		4,354,940.30
Balance, June 30, 1923		327,343.70

APPROPRIATION: "PAY OF PERSONNEL AND MAINTENANCE OF HOSPITALS, PUBLIC HEALTH SERVICE, 1923."

Amount of appropriation		$5,627,394.00
Repayments		402,425.86
Total		6,029,819.86
Expenditures:		
Disbursements	$4,720,354.19	
Encumbrances	515,334.02	
		5,235,688.21
Balance, June 30, 1923		794,131.65
Budget saving		780,000.00

APPROPRIATION: "EXPENSES DIVISION OF VENEREAL DISEASES, PUBLIC HEALTH SERVICE, 1923."

Amount of appropriation		$400,000.00
Expenditures:		
Disbursements	$335,703.18	
Encumbrances	6,256.51	
		341,959.69
Balance, June 30, 1923		58,040.31
Budget saving		25,000.00

APPROPRIATION: "INCREASE OF COMPENSATION, TREASURY DEPARTMENT, 1923."

Total payments, Public Health Service, June 30, 1923	$713,736.70

APPROPRIATION: "INVESTIGATION FOR UNITED STATES COAL COMMISSION, PUBLIC HEALTH SERVICE (TRANSFER UNDER ACT MAY 21, 1920), 1923."

Amount of appropriation		$5,500.00
Expenditures:		
Disbursements	$3,972.08	
Encumbrances	1,527.92	
		5,500.00
Balance, June 30, 1923		None.

Miscellaneous appropriations.

LEPROSY HOSPITAL, HAWAII.

Balance, June 30, 1923	$16,956.35

MARINE HOSPITALS.

Baltimore, Md. (act Mar. 28, 1918): Balance, June 30, 1923	5,782.41
Boston, Mass. (act Mar. 28, 1923): Balance, June 30, 1923	6,809.26
New Orleans, La. (act Mar. 28, 1918): Balance, June 30, 1923	960.07
San Francisco, Calif. (act Mar. 28, 1918): Balance, June 30, 1923	892.02
Savannah, Ga. (act Mar. 28, 1918): Balance, June 30, 1923	5,932.14

(Balances, June 30, 1923.)

Cleveland, Ohio (act Mar. 4, 1909)	100.00
Cleveland, Ohio (act Mar. 4, 1907)	374.95
Cleveland, Ohio (act July 26, 1916)	1,000.00

QUARANTINE STATIONS.

Boston, Mass. (act Oct. 6, 1917):		
Balance, July 1, 1922	$9,685.72	
Expenditures	2,665.05	
Balance, June 30, 1923		$7,020.67
Cape Charles (act Oct. 6, 1917): Balance, June 30, 1923		5,689.98

(Balances, June 30, 1923.)

Brunswick (act June 25, 1910)	1,708.87
Charleston (act Mar. 4, 1909)	634.46
Columbia River (act June 25, 1910)	745.47
Columbia River (act June 12, 1917)	350.90
Columbia River (act July 1, 1916)	4,201.19
Delaware Breakwater (act Mar. 4, 1907)	857.00
Gulf (act Mar. 4, 1907)	353.35
Honolulu (act Sept. 8, 1916)	10,000.00
Mobile (act July 1, 1916)	10,000.00
Honolulu (act Mar. 4, 1907)	390.52
New Orleans (act July 1, 1916)	11,150.90
Pensacola (act Mar. 4, 1917)	18.02
Reedy Island (act Mar. 4, 1909)	66.71
San Francisco (act Mar. 27, 1908)	1,511.71
San Francisco (act June 30, 1906)	180.75
Savannah (act Mar. 4, 1908)	410.85

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